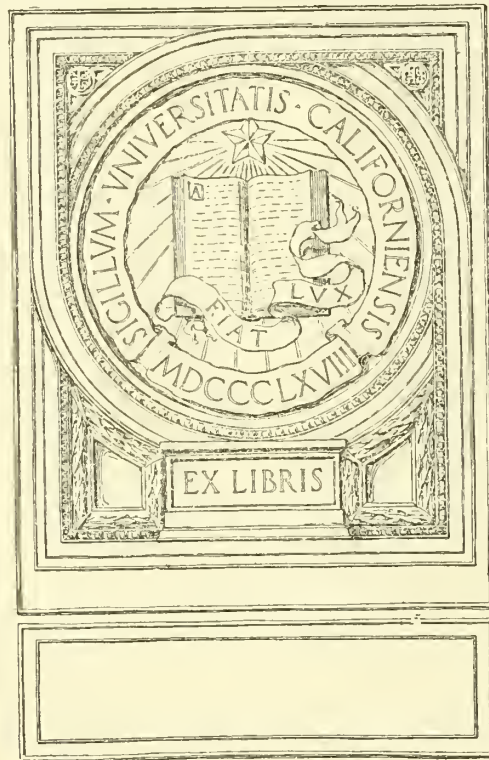


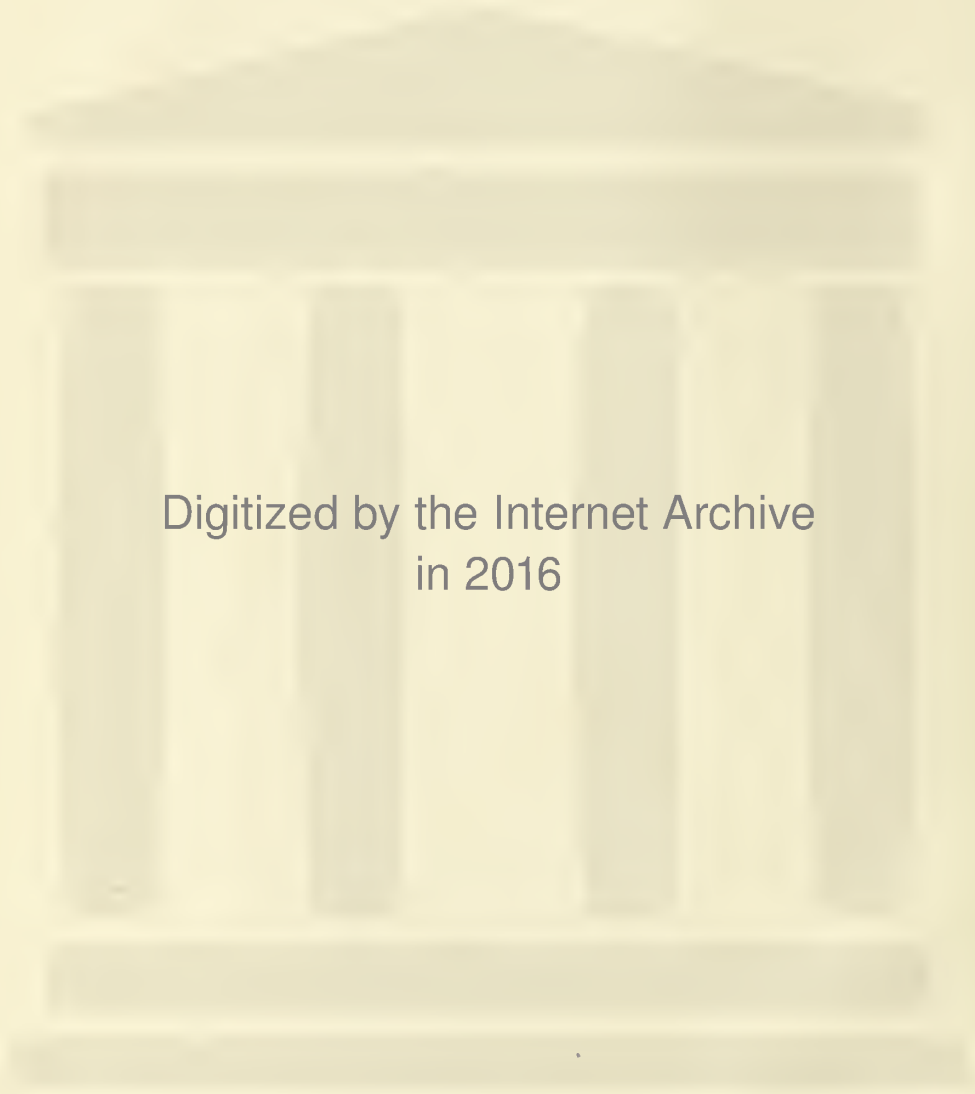


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## INDEX TO VOLUME IV

## A

- Acute Gonorrheal Urethritis, 68.  
 Acute Lymphatic Leukemia, 169.  
 Acute Mastoiditis, Diagnosis and Indications for Operation, 422.  
 Angina Pectoris, Observations on, 593.  
 Anti-Syphilitic Drugs, Comparative Values of, 648.  
 Antrum of Highmore, Puncture of, 319.  
 Appendicitis, Diverticulitis and Ectopic Pregnancy with Special Reference to Differential Diagnosis, 714.  
 Armstrong, John M.: The Treatment of Syphilis, 487.

## B

- Basal Metabolism, The Physiological Basis and Clinical Application of, 602.  
 Barlow, Roy A.: The Value of Conservative Intranasal Draining for Empyema of the Antrum, 445.  
 Beck, Emil G.: Denudation of Inoperable Cancer, An Aid for Efficient Radio-Therapy, 360.  
 Bell, J. W.: Physical Signs of Early Pulmonary Tuberculosis, 382.  
 Benedict, W. L.: The Treatment of Trachoma, 437.  
 Berkman, D. M.: A Preoperative and Postoperative Study of Diabetic Patients with Surgical Complications, 28.  
 Better Refraction Work and for Muscle Training, A Plea for, 432.  
 Bilateral-Cystocele or Cystic Dilatation of the Lower End of the Ureters—A Successful Method of Treatment, 475.  
 Bissell, F. S.: Further Notes Relative to Roentgen Diagnosis of Tuberculosis, 388.  
 Bladder, Submucous Ulcer of, and Its Surgical Treatment, 703.  
 Brandes, H. A.: Spinal Cord Manifestations in Pernicious Anemia, 564.  
 Bratrud, A. F.: Present Status of the Local Anesthesia Problem, 218.  
 Bremerman, Lewis Wine: and Malcolm McKellar: Acute Gonorrheal Urethritis, 68.  
 Brophy, Truman W.: Cleft Palate and Harelip Procedure, 283.  
 Burch, F. E.: Ocular Tuberculosis, 198.

## Book Reviews

- Ames: American Red Cross Work Among the French People, 524.  
 Annual Reprint of the Reports of the Council on Pharmacy and Chemistry of the American Medical Association for 1920, 577.  
 Bakewell: The Story of the American Red Cross in Italy, 523.  
 Bram: Exophthalmic Goiter and Its Nonsurgical Treatment, 410.  
 Brown: The Sympathetic Nervous System in Disease, 62.  
 Burr: Practical Psychology and Psychiatry, 469.  
 Buxton: Anaesthetics, 470.  
 Carey: Bacteriology for Nurses, 749.  
 Caspari: Treatise on Pharmacy, 524.  
 Craig: The Wassermann Test, 681.  
 Crile: A Physical Interpretation of Shock, Exhaustion, and Restoration, 469.

- Dock: A Short History of Nursing, 341.  
 Dunn: Regional Anesthesia, 342.  
 Flint: A Manual of Physical Diagnosis, 61.  
 Freud: A General Introduction to Psychoanalysis, 470.  
 Gammons: Practical Tuberculosis, 469.  
 Gillies: Plastic Surgery of the Face, 410.  
 Gordon: French-English Medical Dictionary, 522.  
 Hare: Symptoms in Diagnosis of Disease, 117.  
 Harrower: Monographs on the Internal Secretions, 410.  
 Head: Studies in Neurology, 62.  
 Horder: Medical Notes, 524.  
 Humphris: Electro-Therapeutics for Practitioners, 523.  
 Jackson: Some Aids in the Record Keeping of Anorectal Cases, 576.  
 Jansen: Feebleness of Growth and Congenital Dwarfism, 524.  
 Jelliffe: Disease of the Nervous System, 342.  
 Jensen: Massage and Exercise Combined, 524.  
 MacLeod: Physiology and Biochemistry in Modern Medicine, 577.  
 McFarland: Text Book of Pathogenic Bacteria and Protozoa, 116.  
 McGuigan: Chemical Pharmacology, 523.  
 Marr: Psychoses of the War, 61.  
 Mott: War Neuroses and Shell Shock, 62.  
 Much: Tuberculosis of Children, 469.  
 Munson: Hygiene of Communicable Diseases, 523.  
 Opie: The Pneumonias and Other Infections of the Respiratory Tract Accompanying Influenza and Measles, 577.  
 Parker: Pathogenic Microorganism, 117.  
 Pattee: Practical Dietetics, 524.  
 Rose: Physical Diagnosis, 469.  
 Sabourn: Rational Treatment of Tuberculosis, 410.  
 Scbamberg: Compend of Disease of the Skin, 681.  
 Sternberg: Biograph of George M. Sternberg, 576.  
 Tilney: Epidemic Encephalitis, 118.  
 Webster: Diagnostic Methods, 117.  
 Wilder: A Primer for Diabetic Patients, 524.

## C

- Cabot, Hugh: Some Unsettled Problems in the Management of Renal Tuberculosis, 534.  
 Carcinoma of the Large Intestine, Involvement of the Lymph Glands, 652.  
 Cardiac Disease, Vital Capacity of the Lungs, 721.  
 Chapman, T. L.: Factitious Toxicity of Previously Simple Goitres, 148.  
 Cholecystectomy with Modified Drainage, 1.  
 Chronic Form of Lethargic Encephalitis, Some Observations, 471.  
 Chronic Lesions of the Hip Joint, Diagnosis and Treatment of, 630.  
 Chronic Nephritis, On the Preventability of Certain Cases of, 611.  
 Cleft Palate and Harelip, 293.  
 Cleft Palate and Harelip Procedure, 282.  
 Cole, Wallace H.: Surgical Tuberculosis in Children, 288.  
 Collins, Arthur N.: Peritonitis and Intestinal Intubation, 9.  
 Compulsory Health Insurance and the Medical Profession, 63.

Congenital Syphilis in Infants and Children, Recent Progress in the Diagnosis and Treatment of, 568.  
 Conservative Intranasal Draining for Empyema of the Antrum, The Value of, 445.  
 Continuation Study for Practitioners: The Outlying Hospital as a Study and Teaching Center, 525.  
 Corbett, J. F.: Painful Scars, 682.  
 Corbett, J. F.: Traumatic Injuries of the Spinal Cord and Roots, 446.  
 Cystocele and Prolapse, 696.  
 Cysts of the Pancreas, 75.

#### Correspondence

Dr. A. J. Chesley, 521.  
 Albert B. Reagan, 49.  
 Dr. E. L. Tuohy, 272.

#### D

Denudation of Inoperable Cancer, An Aid for Efficient Radio-Therapy, 360.  
 Diabetic Patients with Surgical Complications, Pre-operative and Postoperative Study of, 28.  
 Diseases of Children, General Therapy in, 548.  
 Dodson, John M.: Continuation Study for Practitioners: The Outlying Hospital as a Study and Teaching Center, 525.  
 Duodenal Ulcer, 708.

#### E

Earl, Robert: Cystocele and Prolapse, 696.  
 Early Pulmonary Tuberculosis, Treatment of, 96.  
 Early Pulmonary Tuberculosis, Physical Signs of, 382.  
 Electrically Driven Bone Surgery Equipment in Head Surgery, with Particular Reference to Ear, Nose and Throat Operations, Uses and Advantages of 166.  
 Electrocardiograms in Thyro-Toxic Conditions, On, 82.  
 Electro-Cardiograph, Use and Abuse of, 664.

#### Editorials

A. M. A. of Vienna, 731.  
 Annual State Meeting, 573.  
 Basis for the Tuberculosis Campaign, 730.  
 Cancer Campaign, 621.  
 Case Taking, 184.  
 Catholic Hospital Association, 404.  
 Chemical Production in America, 516.  
 Colonel Smith, 453.  
 Compulsory State Health Insurance, 101.  
 Contagious Diseases and the School, 324.  
 Dearth of Trained Nurses, 667.  
 Epidemic Poliomyelitis in Minnesota 1921, 622.  
 Eye Sight Conservation Council, 266.  
 Justice in Mal-Practice Suits, 183.  
 Late Osteopath Bill, 183.  
 Life Extension, 323.  
 Liquor and the Doctor, 41.  
 Minneapolis Clinic Week, 265.  
 Minnesota Medicine Advertisers, 42.  
 Misdirected Routine, 666.  
 National Board of Medical Examiners, 668.  
 New Assistant Editor, 324.  
 New Executive Secretary, 41.  
 Organized Medicine, 515.  
 Outlying Hospitals as Centers for Continuation Courses for Practitioners, 573.  
 Privileged Communications, 102.  
 Reconstructive Surgery, 403.  
 Remarkable Case of Miriam Rubin, 265.  
 So-Called Sheppard-Towner Bill, 450.  
 Torts and the Statutes of Limitations, 103.  
 Tuberculosis in Minnesota, 731.

University Short Courses, 574.  
 Veteran's Bureau, 623.  
 Vitamines and Infant Feeding, 452.  
 White Solidarity, 185.

#### F

Factitious Toxicity of Previously Simple Goitres, 148.  
 Fallopian Tube Infection Period, Problems of, 441.  
 Farr, Robert Emmet: Methods of Meeting the So-Called Shortcomings of Local Anesthesia, 209.  
 Fifty Consecutive Cataract Operations by the Smith-Indian-Fisher Method, A Report on, 370.  
 Fitz, Reginald: On the Preventability of Certain Cases of Chronic Nephritis, 611.  
 Fractures of the Base of the Radius, 151.  
 Fractures, Some Practical Experience with Injuries with Special Reference to, 687.  
 Freeman, Elmer B.: Spasmodic Stenosis of the Esophagus, 390.

#### G

Gaenslen, F. J.: The Diagnosis and Treatment of Chronic Lesions of the Hip Joint, 630.  
 Giffin, H. Z.: The Present Status of Splenectomy as a Therapeutic Measure, 132.

#### H

Hansen, Olga A.: The Use and Abuse of the Electro-Cardiograph, 664.  
 Hare, Earl R.: Appendicitis, Diverticulities and Ectopic Pregnancy with Special Reference to Differential Diagnosis, 714.  
 Hare-Lip and Cleft Palate Deformity, Repair of, 15.  
 Hayes, James M.: The Involvement of the Lymph Glands in Carcinoma of the Large Intestine, 652.  
 Head, George Douglas: Acute Lymphatic Leukemia, 169.  
 Health and Disease, Studies on the Respiratory Organs in, 513.  
 Heart of the Child, Physical Examination of, 240.  
 Helmholtz, Henry F.: Parenteral Infections in Infancy, 608.  
 Hemolytic Icterus, 138.  
 Hemorrhagic Disease of the New-Born, 24.  
 Henrici, A. T. and Gardner, E. L.: A Case of Pulmonary Infection with a New Species of Acid-fast Actinomyces, 443.  
 Hepatitis to Cholecystitis, Relation of, 377.  
 Hirschfelder, Arthur D.: Saligenin, A New Non-Toxic Local Anesthetic and Its Mercury Derivative, A New Antiseptic, 399.  
 Hoffman, Frederick L.: Compulsory Health Insurance and the Medical Profession, 63.  
 Hoffman, Frederick L.: Some New Aspects of the Problems of Cancer Control, 124.  
 Hunt, V. C.: Complication of Prostatectomy, 478.  
 Hunt, Verne C.: Submucous Ulcer of the Bladder and Its Surgical Treatment, 703.  
 Hunt, Verne C.: Surgery of the Prostate, 544.

#### I

Infantile Paralysis, Some Essential Points in the Treatment of, 484.  
 Intestinal Obstruction, Post-Operative, 559.

#### J

Jamess, J. H.: Ocular Imbalance, 237.  
 Judd, E. S.: A Consideration of the Treatment of the Lesions of the Thyroid Gland, 315.  
 Judd, E. S.: Cysts of the Pancreas, 75.  
 Judd, Edward S.: Surgery of the Ureter, 597.



## K

- King, Walter E.: The Laboratory Diagnosis of Syphilis, 490.  
 Kuegle, F. H.: The Indications for X-Ray Therapy in Tuberculosis, 498.

## L

- Labat, Gaston L.: Regional Anesthesia in Surgery of the Head, 195.  
 Laird, Arthur.: A Comparison of Some Municipal Health Budgets, 552.  
 Lesions of the Thyroid Gland, Consideration of the Treatment of, 315.  
 Local Anesthesia Problem, Present Status of, 218.  
 Local Anesthesia Technique, Present Concept of, 215.  
 Logeheil, R. C.: The Physiological Basis and Clinical Application of Basal Metabolism, 602.  
 Lyon, E. P.: Organization of Medical Schools and Hospital Facilities for Graduate Medical Education, 90.  
 Lyons, H. R.: Puncture of the Autrum of Highmore, 319.

## M

- MacCarty, Wm. Carpenter and Jackson, Arnold: The Relation of Hepatitis to Cholecystitis, 377.  
 Marclay, Walter J.: The Treatment of Early Pulmonary Tuberculosis, 96.  
 Martin, T. R.: Duodenal Ulcer, 708.  
 Maxeiner, Stanley: The Present Concept of Local Anesthesia Technique, 215.  
 Mayo, Charles H.: Cholecystectomy with Modified Drainage, 1.  
 Mayo, Chales H.: Tuberculosis Peritonitis, 259.  
 Mayo, William, J.: Hemolytic Icterus, 138.  
 Medical and Dental Professions toward the Constitutional Influence of Dental Pathology, An Attempt to Unify and Harmonize Points of View, 305.  
 Medical Expert Witness, The 539.  
 Medical Schools and Hospital Facilities for Graduate Medical Education, Organization of, 90.  
 Mentzer, W. E. and Tuohy, E. L.: An Attempt to Unify and Harmonize Points of View of Medical and Dental Professions toward the Constitutional Influence of Dental Pathology, 305.  
 Meyerding, H. W.: Delayed Union and Nonunion of the Radius and Ulna, 223.  
 Michelson, H. E.: Comparative Values of the Anti-Syphilitic Drugs, 648.  
 Miller, Joseph L.: Some of the Problems of Internal Medicine, 119.  
 Minnesota Medicine in the Making, Personal Reminiscences, 579.  
 Mock, Harry E.: Reconstructive Surgery, 343.  
 More, C. W.: Some Practical Experience with Injuries with Special Reference to Fractures, 687.  
 Morsman, L. W.: Uses and Advantages of Electrically Driven Bone Surgery Equipment in Head Surgery, with Particular Reference to Ear, Nose and Throat Operations, 166.  
 Murray, William R.: Diagnosis and Indications for Operation in Acute Mastoditis, 422.  
 Myers, J. A.: Studies on the Respiratory Organs in Health and Disease, 513.  
 Myers, J. A.: Studies on the Respiratory Organs in Health and Disease. The Value of Vital Capacity Readings in Clinical Medicine, 635.

## N

- Nasal Accessory Sinus Infection, 645.  
 Nasopharyngeal Malignancy to Other Diagnosis, Relation of, 419.  
 New, G. B.: The eRlation of Nasopharyngeal Malignancy to other Diagnosis, 419.

- New Non-Toxic Local Anesthetic and Its Mercury Derivative, a New Antiseptic, 399.  
 Nye, Carroll A.: The Medical Expert Witness, 539.

## O

- Ocular Impalance, 237.  
 Ocular Tuberculosis, 198.  
 Ophthalmoscope in Diagnosis, Value of, 640.  
 Orr, H. Winnett: The Use of Splints in Spine Injuries, 511.  
 Ott, William O.: Treatment of Sciatica, 18.

## Obituary

- Aldrich, Flora L., 326.  
 Anderson, O. W., 104.  
 Armitage, Thomas Leger Firth, 456.  
 Baldwin, Frederick R., 104.  
 Barrett, Elmer E., 625.  
 Bedint, Jasper, 104.  
 Bradley, Frank L., 32.  
 Chapman, W. E., 186.  
 Edmunds, Ira Leslie, 186.  
 Fairburn, Archibald Cunningham, 670.  
 Farmer, J. C., 186, 326.  
 Frost, E. S., 456.  
 Gillette, Arthur J., 326, 406.  
 Grant, James Wiley, 406.  
 Hambroer, Wm. 104.  
 Haynes, Stanley H., 670.  
 Hollister, William L., 268.  
 Hunt, William A., 267.  
 Just, Adolph A., 268.  
 Malmgren, Carl V., 268.  
 Merritt, George F., 732.  
 Mosse, F. R., 104, 186.  
 Reimstad, C. S., 625.  
 Rundstrom, John, 732.  
 Smith, Charles Eastwick, Jr., 669.  
 Spaulding, Alfred Eugene, 48.  
 Stewart, John Henry, 732.  
 Stout, John C., 326.  
 Ward, L. A., 186.  
 Welcome, Forado H., 104.  
 Whittemore, John Gooch, 104.

## P

- Painful Scars, 682.  
 Parenteral Infections in Infancy, 608.  
 Parotid Gland, Mixed Tumors of, 155.  
 Peritonitis and Intestinal Intubation, 9.  
 Pernicious Anemia, Spinal Cord Manifestations in, 564.  
 Peterson, Reuben, and Zwaluwenburg, James G.: Experiences with Pneumoperitoneal X-Ray as an Aid to Gynecological Diagnosis, 415.  
 Plastic Surgery of the Eyelids and Orbit, 504.  
 Pneumoperitoneal X-Ray as an Aid to Gynecological Diagnosis, Experiences with, 415.  
 Polycythemia Vera, 161.  
 Poliomyelitis with Immune Horse Serum by Various Physicians, Treatment of, 588.  
 Pratt, F. J. and Pratt, J. A.: A Report on Fifty Consecutive Cataract Operations by The Smith-Indian-Fisher Method, 370.  
 Problems of Cancer Control, Some New Aspects of, 124.  
 Prostate, Surgery of, 544.  
 Problems of Internal Medicine, 119.  
 Prostatectomy, Complications of, 478.  
 Pulmonary Infection with a New Species of Acid-fast Actinomyces, A Case of, 443.  
 Pulmonary Tuberculosis, Classification and Symptomology, 384.

## R

- Radium; Its Therapeutic Uses in Surgery, 533.  
 Radius and Ulna, Delayed Union and Nonunion of, 223.  
 Ramsey, Walter, A.: Recent Progress in the Diagnosis and Treatment of Congenital Syphilis in Infants and Children, 568.  
 Reconstructive Surgery, 343.  
 Renal Tuberculosis, Some Unsettled Problems in the Management of, 354.  
 Respiratory Organs in Health and Disease, Studies on, The Value of Vital Capacity Readings in Clinical Medicine, 635.  
 Richards, Ernest T. F. and Herman, Edgar T.: Polycythemia Vera, 161.  
 Riggs, C. Eugene: Minnesota Medicine in the Making; Personal Reminiscences, 579.  
 Riggs, C. Eugene: Some Observations on the Chronic Form of Lethargic Encephalitis, 471.  
 Riggs, C. Eugene: Three Neuropsychiatric Notes Epilepsy, Lethargic Encephalitis and the Dementia Precox Syndrome, 141.  
 Ritchie, Harry P.: The Repair of Hare-lip and Cleft Palate Deformity, 15.  
 Roentgen Diagnosis of Tuberculosis, Further Notes Relative to, 388.  
 Rodda, F. C.: General Therapy in Diseases of Children, 548.  
 Rodda, F. C.: Hemorrhagic Disease of the New-Born, 24.  
 Rosenow, Edward C.: The Treatment of Poliomyelitis with Immune Horse Serum by Various Physicians, 588.  
 Rothschild, Harold J.: The Value of the Ophthalmoscope in Diagnosis, 640.

## S

- Sacro-Coccygeal Dermoids, 428.  
 Schelesselman, J. T.: Nasal Accessory Sinus Infection, 645.  
 Schwyzer, Arnold: Radium; Its Therapeutic Uses in Surgery, 533.  
 Sciatica Treatment of, 718.  
 Seham, Max: The Physical Examination of the Heart of the Child, 240.  
 Shastid, Thomas Hall: A Plea for Better Refraction Work and for Muscle Training, 432.  
 Shearer, William Lete: Cleft Palate and Hare-lip, 293.  
 Sistrunk, W. E.: Mixed Tumors of the Parotid Gland, 155.  
 Sivertsen, Ivar: Post-Operative Intestinal Obstruction, 559.  
 So-Called Shortcomings of Local Anesthesia, Methods of Meeting, 209.  
 Some Municipal Health Budgets, A Comparison of, 552.  
 Spasmodic Stenosis of the Esophagus, 390.  
 Spina Bifida, 244.  
 Spine Injuries, Use of Splints in, 511.  
 Splenectomy as a Therapeutic Measure, Present Status of, 132.  
 Slater, S. A.: The Child's Place in the Tuberculosis Campaign, 650.  
 Staley, John C.: Sacro-Coccygeal Dermoids, 428.  
 Staples, H. L.: Observations on Angina Pectoris, 593.  
 Stein, George C.: On Electrocardiograms in Thyro-Toxic Conditions, 82.  
 Surgery of the Head, Regional Anesthesia in, 195.

- Surgical Tuberculosis in Children, 228.  
 Syphilis, Laboratory Diagnosis of, 490.  
 Syphilitic, Treatment of, 487.

## Societies

- All-American Conference on Venereal Disease, 42.  
 American Medical Association, 327.  
 American Medical Editors Association, 327.  
 American Proctologic Society, 327.  
 American Public Health Association, 671.  
 Blue Earth Valley Medical Society, 733.  
 Central Minnesota Medical Association, 624.  
 Eye Sight Conservation Council, 268.  
 Lyon-Lincoln Medical Society, 733.  
 Medical Library Association, 518.  
 Minneapolis Clinic Week, 186.  
 State Medical Society of Wisconsin, 574.  
 Minnesota Pathological Society, 327, 671.  
 Minnesota State Medical Association, 268, 456, 517.  
 Minnesota State Registered Nurses' Association, 42.  
 Mower County Medical Society, 671.  
 Northern Minnesota Medical Society, 671.  
 St. Louis County Medical Society, 733.  
 St. Paul Clinic Week, 43.  
 Second International Congress of Eugenics, 518.  
 Southern Minnesota Medical Association, 103, 268, 406, 671, 732.  
 Southeastern Minnesota Medical Society, 456.  
 Tri-State District Medical Society, 624.  
 Upper Mississippi Medical Society, 671.  
 Wabasha County Medical Society, 518.

## T

- Thomas, Gilbert J. and Mellen, Dan H.: Bilateral Cystocele or Cystic Dilatation of the Lower End of the Ureters—A Successful Method of Treatment, 475.  
 Three Neuropsychiatric Notes—Epilepsy, Lethargic Encephalitis and the Dementia Precox Syndrome, 141.  
 Tibbetts, M. H.: Some Essential Points in the Treatment of Infantile Paralysis, 484.  
 Trachmoma, Treatment of 437.  
 Traumatic Injuries of the Spinal Cord and Roots, 446.  
 Tuberculosis Campaign, The Child's Place in, 650.  
 Tuberculous Peritonitis, 259.

## U

- Ulrich, Henry L. and Nathanson, Morris H.: The Vital Capacity of the Lungs in Cardiac Disease, 721.  
 Ureter, Surgery of, 597.  
 Useless Knowledge, Acquisition of, 500.

## W

- Waldron, C. W.: Plastic Surgery of the Eyelids and Orbit, 504.  
 Wanous, Ernest A.: Problems of the Fallopian Tube Infection Period, 441.  
 Webb, Roscoe C.: Fractures of the Base of the Radius, 151.  
 Wilson, Louis B.: The Acquisition of Useless Knowledge, 500.  
 Wittich, F. W.: Classification and Symptomatology of Pulmonary Tuberculosis, 384.  
 Woltman, M. W.: Spina Bifida, 244.

## X

- X-Ray Therapy in Tuberculosis, Indications for, 498.



# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### CHOLECYSTECTOMY WITH MODIFIED DRAINAGE\*

By CHARLES H. MAYO, M. D.  
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A problem which frequently confronts the surgeon in operations for gallstones, and for cholecystitis, with or without stones, is whether to close, drain, or remove the gallbladder. In the eventful evolution of surgery during the last thirty years notable progress has been made in surgery of the gallbladder. Progress has been made of course in all surgery of the upper abdomen which in early years was practiced to conserve life; operations of necessity were the rule for obstruction, acute pain, and infection in advanced stages of disease. In the lower abdomen the surgery has been largely that of sacrifice in dealing with infection in organs of reproduction or with unessential structures such as the appendix.

Operative indications in the upper abdomen in the early period of antiseptic surgery involved a high mortality, especially in diseases of the gallbladder. It was soon recognized that the danger lurked in the complications such as abscess of the liver, pancreatitis with fat necrosis, perforating gallbladder, and jaundice. Practically a vicious circle was developed by a late operation which resulted in high mortality, and the high mortality lead to dangerous delay. The gallstones which were essential to early operative procedures on the gallbladder, although often a cause of obstruction with secondary complications, lost their role as a primary entity in disease and cholecystitis became accepted as the primary condition. This is demonstrated by the Clinic records for the

year 1919 when 1254 patients were operated on for cholelithiasis and cholecystitis, 714 (61 per cent) of whom had stones; the operative mortality was 2.2 per cent. Cholecystitis without stones with changes in the mucous membrane of the gallbladder caused papillomas, degenerative processes, and the so-called strawberry and fish-scale types in 490 patients (39 per cent). The operative mortality in these was 2.4 per cent.

In 1886 Galippe first suggested bacteria as a causative factor in gallstones. Gilbert, in 1898, followed with practical demonstrations of infected gallbladders and stones, and in the same year Welch demonstrated bacteria in gallstones. Later investigators have found bacteria in the bile of the gallbladder and studied the infections with cholecystitis, even producing gallstone crystals in the mucous membrane. The routes of the infection ordinarily accepted were based on the theory that the bile primarily was infected; this could occur, first, through the portal circulation, the bacteria not having been destroyed in passing through the liver, second, through the lymphatic system by retrograde movement, and, third, through the common and cystic ducts from the intestine.

The opening of the gallduct, which also delivers the pancreatic secretion, is usually located beneath an over-hanging fold of mucous membrane in the duodenum and is thereby well protected. The little terminal opening is surrounded by the muscle ring of Oddi which keeps it closed and which should serve to equalize the tension of bile in the ducts and gallbladder as opposed to the hepatic circulation producing it. The sphincter of Oddi is stronger in animals that have gallbladders than in those without them, according to Mann.<sup>11</sup> The gallbladder in health has a capacity for temporary storage of several ounces of bile, and rhythmic contractions stimulated by the contents of the gallbladder and ducts occur, causing such delivery

\*Presented before the Minnesota State Medical Association, September, 1920, St. Paul, Minn.



as is common to the duets, the ureters, and the small intestine. Their contraction readily overcomes this muscularly closed outlet, and the peculiar manner in which nature delivers a duet into a viscus by passing it partly through the wall, then continuing between the outer wall and the mucous membrane, so that internal pressure closes by compression from within but does not interfere with peristaltic delivery through the duet, is true of the common duet; under normal conditions it prevents back flow. This also is true of the little duets delivering from the lobules of the pancreas into the main pancreatic duets, not directly at right angles, but on a slant so that internal pressure tends to close them, undoubtedly a provision of nature to prevent the possible irritative effects of chemically changed bile in obstruction from entering the small pancreatic duets.

Rosenow's investigations were based on the theory that the infection is carried through the blood stream, even in the tissues closely associated in function or connected by duets, in other words, the specificity of localization of bacteria, which is now commonly accepted. It is probable that the chemical effects of bacteria and stasis of the gallbladder cause the development of stones, the materials for which are taken from the blood stream, although it must be admitted that the same materials are also present in bile.

Specific destruction of tissues by toxic agents has long been known; recent experiments of Mann<sup>10</sup> are most illuminating in showing the chemical effects of nontoxic drugs acting through the blood stream, being wholly selective in their effects on the gallbladder. Mann has shown that Carrel-Dakin solution injected intravenously into dogs in amounts from 5 c.c. to 10 c.c. to each kilogram, produces selective changes in the circulation of the gallbladder and destruction of that viscus, varying according to the quantity of solution used.

The increased cholesterol content of blood during pregnancy undoubtedly contributes to the higher percentage of women affected by cholecystitis with stones; the ratio is about 77 per cent in females to 23 per cent in males. Approximately 90 per cent of the women have borne children and have had the first attack

in close relation to a pregnancy. It is of interest to note that cholecystitis without stones occurs in women twice as often as in men.

Is it probable that cholecystitis can be cured by temporary drainage? Years ago before we began freely to employ cholecystectomy as a definite surgical procedure we found that it was not generally possible to cure cases of cholecystitis without stones, although we then were draining gallbladders without marked evidence of cholecystitis after the removal of stones. The removal of stones removed the cause of acute colics but the patients were frequently left with the reflex gastric symptoms evident before operation, which were attributed to dyspepsia, but which we now recognize as being caused by cholecystitis. We further found that drainage, which gives only temporary relief, left the fundus of the gallbladder fixed to the abdominal wall and frequently added to the impairment of function and often still further increased the suffering of the patients for varying periods. I believe, however, that it is a debatable question whether some of the milder cases of cholecystitis should not be considered medical instead of surgical.

A general knowledge of the pancreas and its diseases is very essential in the diagnosis of the diseases of the upper abdomen. In the majority of instances the condition of the pancreas, even in tumor formation, is overlooked unless the changes are gross, and mild derangements of function are often attributed to obstruction or disease of the liver. To be sure the condition of the pancreas is usually secondary to an infection involving the structure of the gallbladder, and although the infection may be brought through the continuity of tissues involved, through the duet itself, or through the lymphatics surrounding it, experimental evidence indicates that the pancreas too is probably more commonly affected through the blood stream. Of the 1254 patients seen at the Clinic with gallstones and cholecystitis during the last year 339 showed changes in the pancreas so marked as to be recognized clinically.

A consideration of the grosser pancreatic changes, with jaundice due to duet obstruction, increases the interest of a discussion as to whether the treatment in some cases of usually

distended gallbladder shall be removal, drainage, cholecystectomy, or cholecystostomy. In certain cases in which there is marked cholecystitis with or without stones cholecystostomy with drainage for many weeks or several months may be indicated to relieve the patient of a pancreatitis. If the gallbladder is preserved a relapse may be relieved by cholecystenterostomy or cholecystgastrostomy to furnish a new route of bile delivery, operations often performed in cancer of the pancreas accompanied by jaundice. In such cases the distended gallbladder does not show disease. Since the common duct often takes up its work intermittently, however, the fistula tends to close; to prevent this, the common duct should be closed, thus insuring permanency of the fistula.

From 1907 to 1920 we operated on 158 patients with cancer of the gallbladder. Previous to 1910 the ordinary operation was a cholecystostomy for cholecystitis with and without stones. During this time 350 cholecystectomies were performed, 3 per cent of which (0.82 per cent of the total number

of operations on the gallbladder and duct) were for cancer, cholecystectomy being performed only in cases of advanced disease. Increased ability to diagnose cholecystitis and gallstones has led to a greatly increased number of early operations. Eleven thousand, four hundred twenty-nine operations on the gallbladder were performed from January, 1907

to August, 1920; of these 7,688 were cholecystectomies, but since the percentage of early operations before gross disease develops has increased greatly since 1910 the percentage of cancer found has been greatly reduced.

Cholecystostomy is now reserved for the special case in which advanced age or complications make it desirable; 3346 cholecystostomies

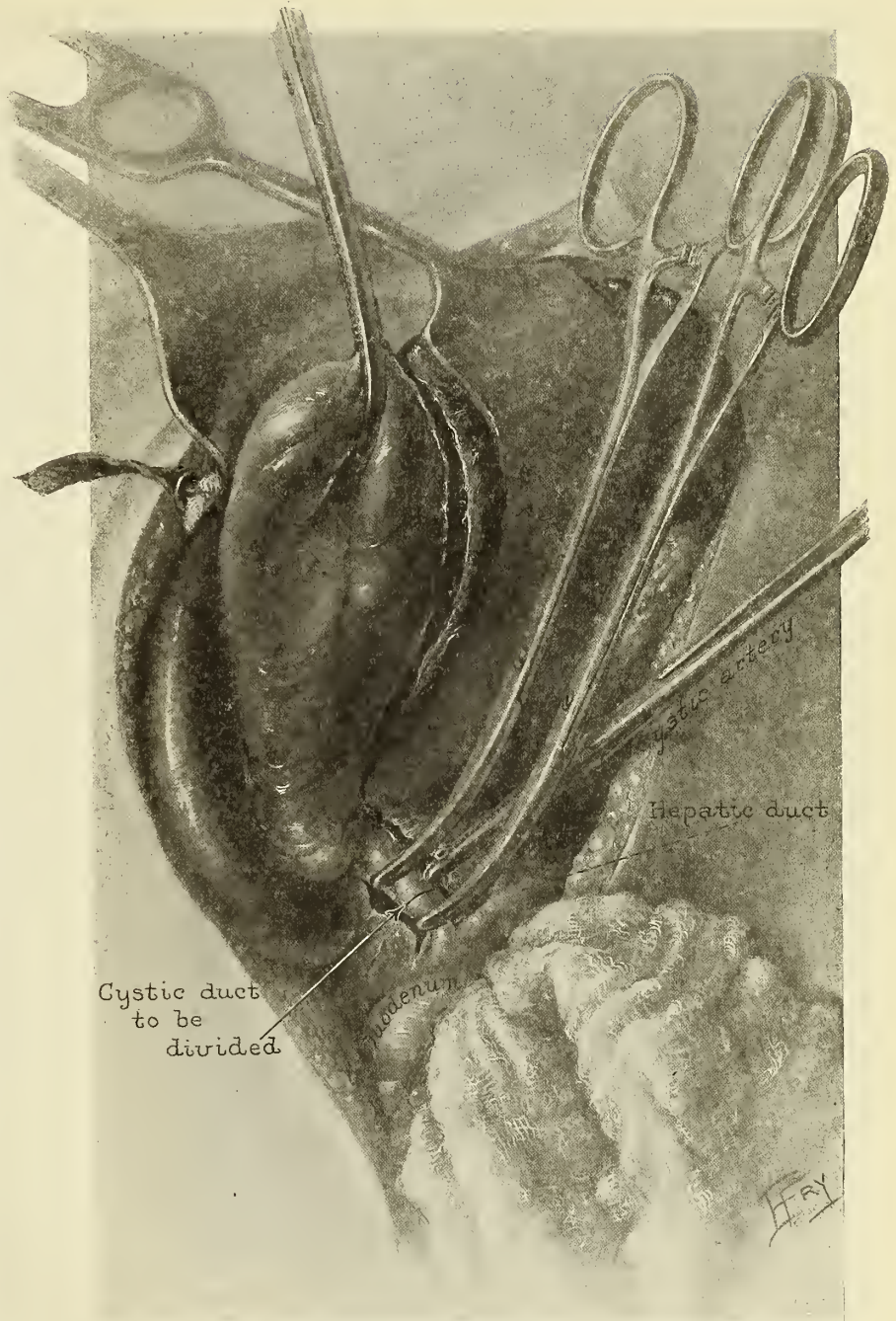


Fig. 1. Gallbladder freed from the liver on the left side; cystic duct ready to be divided between forceps.



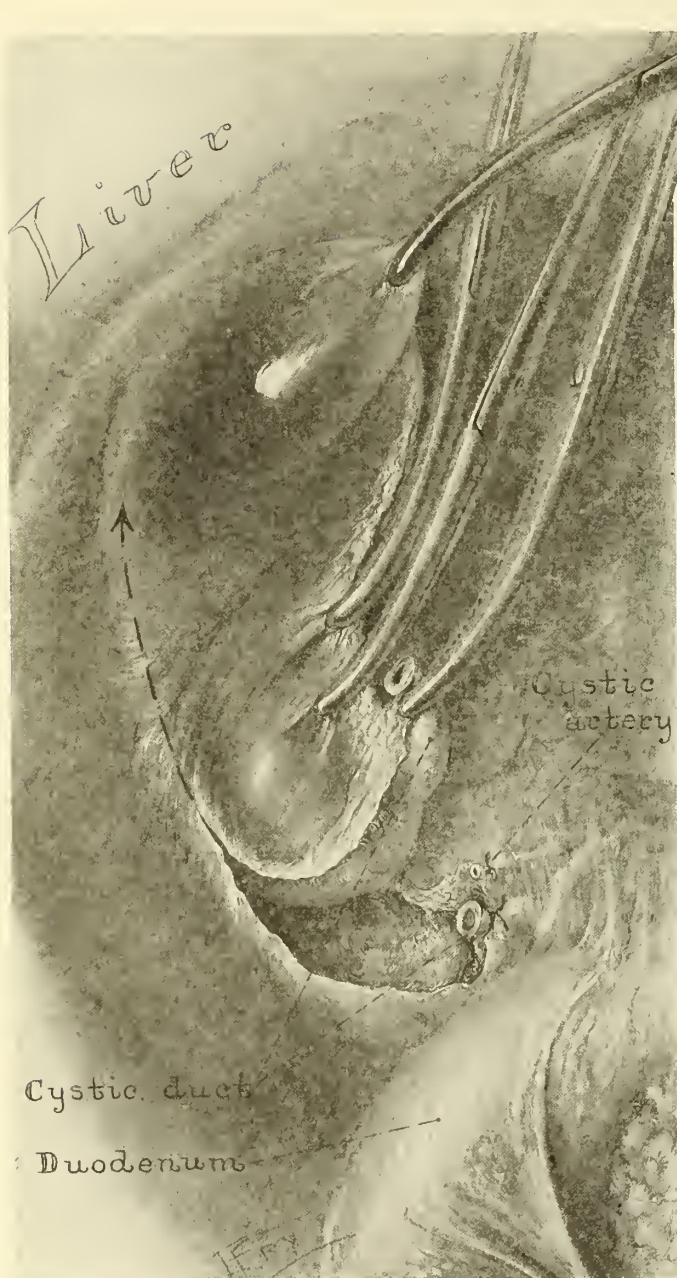


Fig. 2. Gallbladder freed on the left side, and the duct divided. Dissection to be continued along dotted line.

have been performed at the Clinic from January, 1907 to August, 1920. Cholecystectomy with local peritoneal drainage has been the rule, but it is now used for gross infections, without biliary drainage, although biliary drainage is still provided for in most cases of common duct disease, closure being made in suitable cases without biliary drainage but with peritoneal drainage.

In an investigation by Dr. Judd and Dr. Har-

rington of 2027 operations on the gallbladder and ducts performed at the Mayo Clinic in 1917 and 1918 it was shown that 219, nearly 11 per cent, were secondary. In 109 of these calculi were found in the gallbladder or ducts, or in both. The primary operation had been performed at the Mayo Clinic in but sixty-four of the 219 (2.09 per cent). Some secondary operations are unavoidable. For instance, in our experience fresh soft stones have reformed three times in the common duct of the same patient and in a small percentage of cases stones had formed primarily in the hepatic ducts. We believe this great reduction in secondary operations in the Clinic has come from the general practice of cholecystectomy. Deaver has stated that 65 per cent of the secondary operations are due to failure to remove the gallbladder, and in a recent paper Jacobson, reporting 397 cases of gallbladder disease, gives the percentage of secondary operations as 4.2 per cent. If no gallstones are felt the whitening and thickening of the gallbladder wall is of some value in detecting cholecystitis during exploration. The question of adhesions must be weighed carefully in order to decide whether they are produced by the inflamed wall of

the gallbladder or by perforating ulcer of the stomach or duodenum; sometimes both conditions are present in the same person. The appearance of local cirrhosis of the liver, shown by White and contracted areas back of the attachment of the gallbladder, is of value as an indication of bacterial invasion, yet it must be admitted that the appearance of the gallbladder and liver may be perfectly normal in some



cases of stone and of extensive degeneration of the mucous membrane.

The palpable evidence of enlargement of the glands on the ducts, of which there is normally one on each duct and often two, is of the greatest importance. The one on the common duct next to the pancreas is often swollen in connection with duodenal ulcer as well as with pancreatitis, yet pancreatitis most frequently accompanies cholecystitis. The surgeon always should take advantage of his opportunity, when the abdomen is open, to examine these glands with a finger through the foramen of Winslow and a thumb over the ducts. By palpating the glands he may learn their normal condition, and thus be conscious of any changes.

In cholecystectomy a right oblique incision is made. I prefer to slant gradually through the vertical lines of muscle fibers, so that a firmer union of continuously divided muscle may be secured than by a split muscle incision; however, there are many incisions which will serve. Occasionally a gallbladder is placed deep beneath the liver and under its costal margin. Then the liver may be forced toward the midline by packing a large gauze square over the top and to the right of the organ. This maneuver of Masson brings the gallbladder directly into the exposed field and greatly facilitates the operation. Large distended and necessarily obstructive gallbladders are at times emptied by a trocar, and in acute inflammations may then be split from top to bottom. The mucous membrane in such conditions readily peels from the connective tissue on the surface of the liver. Bleeding is usually very slight; if it is at all sharp the separation has gone unnecessarily deep beneath the connective tissue on to the liver; the bleeding may be controlled by a temporary hot pack. The anterior surface of the gallbladder is completely cut away and the duct closed by suture. As a rule gallbladders are removed intact without being opened. The cystic duct is isolated, clamped between two forceps and divided, the cut ends of the duct exposed being touched with tincture of iodine and double ligated (Fig. 1). The cystic artery is then caught and ligated (Fig. 2). The distal end of the cystic duct is drawn up and with blunt pointed dissecting scissors the

gallbladder is separated from the liver from below upward. This procedure prevents, to a great extent, the possibility of injury of the common or hepatic duct. The greatest danger, however, is accidental division and loss of the cystic artery during operation. Variations in the ducts and in the origin of the cystic artery lead to such accidents. The papers of Brewer, Ruge, Gosset, and Eisendrath<sup>3,4</sup> describing such variations are well worthy of perusal. The surface peritoneum of the gallbladder which is left at its attachment to the liver furnishes an easily sutured field. An interlocking catgut suture closes the raw surface down to the ligated cystic duct. The needle with suture is

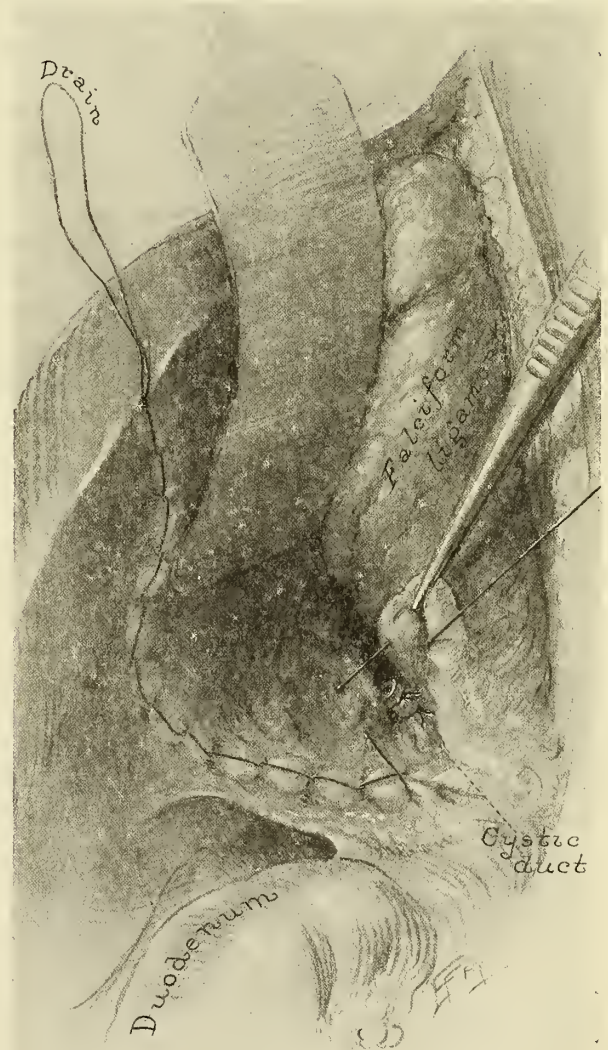


Fig. 3. Buttonhole suture of catgut placed; stump of cystic duct ready to be buried.

now passed alternately into the right border of the gastrocolic omentum and the right border of the gastrohepatic omentum with an occasional catch into the fatty round ligament to include it in the suture. This fatty apron shuts the stomach, pylorus, and duodenum off from possible fixation to the liver through adhesive attachment. If drainage is indicated it is between the liver and the fat and not between the liver and the pylorus. More and more I am closing the abdomen without drainage, in only a few instances satisfying my old inclination to drain by leaving the double strand of catgut attached to the liver, where the gallbladder fundus was separated from it, and continued in a suture down to the cystic duct (Fig. 3). This catgut is brought out of the abdomen, but the abdomen (peritoneum, muscle, fascia, and skin) is closed tightly around it. Should there be any indication within a few days of a retained secretion forceps may be passed along the strand of catgut into the abdomen, as any drainage would have followed the catgut suture line to the abdominal wall. If by the fourth day the catgut is not required it is placed under slight tension and cut beneath the skin. This method of cholecystectomy with complete closure of the abdomen has reduced very largely the danger of hernia which was not infrequent in the old days of drainage, whether of bile or peritoneal exudate.

Failure to cure may be due to age or to associated disease. Therefore a careful general examination is required before operation; and with the abdomen open exploration should be made to determine the presence of other disease. The appendix may be the original focus. A diseased pancreas may be the cause of future colic, even after the gallbladder is removed; consequently the condition of the pancreas should always be stated in the operative records.

The percentage of cures following operations on the gallbladder varies; some patients with colic from stone consider themselves cured if relieved of the colic. A definite cure occurs in approximately 60 per cent, great improvement in 30 per cent, and 10 per cent have less improvement because of the extent of the disease or complications.

In conclusion I would say that the diseased

gallbladder should be treated by cholecystectomy as a rule, its drainage being required under special conditions, that abdominal biliary drainage is not indicated except in complications, and that abdominal drainage is indicated only in conditions in which it would be used in the surgical treatment of other abdominal disease in which infection is present or has been present.

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#### DISCUSSION

DR. ARCHIBALD MACLAREN, St. Paul: This very remarkable and thoro presentation of the whole subject of gall-bladder surgery has interested us very



much. In looking up this subject, I was quite surprised to find that Mayo-Robson, in a work that was written very recently, reports that in 3000 cases of his own, the return of stones after cholecystotomy was very small. This interested me very much, so taking the first 150 cases of my own, where sufficient length of time had elapsed, and following them down, to see what percentage of returns were present, in this number of cholecystotomies, who came to me with further complaint, I found there were just 4 per cent of return of stones where simple drainage of the gall-bladder was used. Of course I do not know how many there were who did not return to me for care, or how many consulted some other surgeon. My records show, however, that the most of these patients have been absolutely cured, for a period of many years.

The most important problem to me, is, in what class of cases shall we remove the gall-bladder? And in what class of cases shall we just open and drain?

Some of my surgical friends, say, that they remove the gall-bladder in every case. I would like to do this, because I feel better satisfied when the gall-bladder is out, and during the last two years I have removed three-fourths of the gall-bladders that I have operated upon. But there is a class of gall-bladders that I feel sure, should not be removed; these are the most acute inflammatory gall-bladders, with particular emphasis on the ones in which perforation has occurred. If you have a perforation, usually you also have an acute inflammatory condition, similar to an abscess formation of the appendix. We all know the result if we try to do too much with an acutely inflamed appendix, the results under like condition of the gall-bladder are identical. I know by experience. I do not know whether my experience in this is different from the average, but it has been sufficient to convince me, of the desirability of not removing the gall-bladder under these conditions.

When you remove a gangrenous gall-bladder, you leave under the liver a raw surface about the size of your hand, unprotected by peritoneum. You can do a great deal in the abdominal cavity, if you leave the peritoneum alone, but the minute you take off a piece of the peritoneum and expose the cellular tissue of the abdominal wall or intra-peritoneal organs, take care, for the patient, if peritonitis develops is almost sure to die, according to our experience.

DR. JOHN T. ROGERS, St. Paul: I would like to hear Dr. Mayo elaborate a little on the subject of just what class of cases should be drained with his catgut suture. I would like to hear a little more on that subject. I am familiar with the Eisendrath literature on the subject, but I am not so clear in my own mind that in the cases of gall-stones with complications or the cases of cholecystitis with marked thickening of the gall-bladder or with common duct infection, I am ready to accept the dictum

of no drainage or even catgut drainage. The peritoneum does not stand the irritation of bile, especially of infected bile. I always feel a good deal safer when I put in at least a little cigarette drain, perhaps not down to the cystic duct, as is so commonly done, but at least through the abdominal wall.

The evolution of gall-bladder surgery has been, perhaps, the most satisfactory of any in general surgery. The time was not many years ago when we were constantly seeing and operating on recurrent gall-bladders. I mean by that the gall-bladders that had been drained and that came back for a second operation. I cannot tell you the percentage of my cases, because I think most of them go to Dr. Mayo or to some other surgeon—the cases I have drained in the past, but for many years I have removed the gall-bladder in every case where the patient's condition was such that I dared to go on with the cholecystectomy. In such cases as Dr. MacLaren describes I think those are the very cases in which I would remove the gall-bladder. I doubt if the raw surface remaining after splitting the gall-bladder and removing the mucous membrane is an atrium for the spread of infection. Nature takes care of such raw surfaces in a very short time.

Now the cases that I do not drain are rare, but I have a case every once in a while where the gall-bladder is pendulous and movable, with few adhesions, and filled with gall-stones, and perhaps can be easily removed; there is no thickening of the ducts, the common duct is not thickened, I can tie off the cystic duct and remove such a gall-bladder and I would feel safe in not draining it, but those rare cases.

There is another class of cases that Dr. Mayo spoke of, which I see rarely, the so-called "strawberry" gall-bladder. That there is such a thing, there is, of course, no doubt, but I have an idea that the great majority of mistakes in diagnosis of gall-bladder disease where the gall-bladder has been removed merely because of some inflammation in the mucous membrane of that gall-bladder, are the cases that I would close up without drainage, even a cigarette drain. In those cases in which there is marked pathology I am still unconvinced that complete closure of the abdomen is the proper thing in gall-bladder surgery and especially in those cases that have a pancreatic infection. I believe that drainage should be prolonged either through the common duct or, in rare instances, in drainage through the gall-bladder, but I would like to hear more from Dr. Mayo as to just what class of cases he is closing without drainage.

DR. JOSEPH A. BLAKE, New York City: I did not come prepared to discuss this subject. I have not had much gall-bladder experience in the last few years, but in regard to the question of drainage and the question of removal, it all comes down, it seems to me, to a matter of common sense. How much should be done and what should be left, all this de-

pends largely upon the condition of the patient. Now I should just like to tell a story illustrating this, of two patients who were operated on in New York last year. I heard this directly from the family physician who was present. These men were two parallel cases, excepting that one had diabetes. Both were 55 years old and both had acute abdomens from a perforated gangrenous appendix. One surgeon came in, sat down on the edge of the bed, took out a pair of scissors and artery clamp from his pocket, opened the abdomen with the scissors, put in the artery clamp, pulled out the appendix, cut it off with the scissors, left the artery clamp in the belly, and put on a dressing,—and by the way this was the man who had the diabetes. It only took a minute to do it, there was no traumatism, merely a little hole. He said to the family physician, "You can change that dressing tomorrow." The physician asked, "Are you not coming back?" "No, you can take care of the case." "What will I do with that clamp?" "Oh! that will come out in a few days", which it did and the man got well.

The other man was perfectly strong; he was given an anesthetic, a large incision made, the appendix removed, the base carefully inverted, the peritoneum sewed over the mucous membrane, and then a complete toilet of the abdomen was done with gauze all through and drains inserted, and the man naturally died the next day.

Those cases interested me very much and they are very instructive. In the acute abdomen if we can relieve the patient it is much better to do that and get out. In those cases the appendix was removed. I always believe in removing the offending organ or the source of infection when you can. In gangrenous gall-bladders it is very easy to make an incision under local anesthesia, relieve the patient, and afterwards do a cholecystectomy, because this does not amount to much.

This is hardly a discussion of Dr. Mayo's point, it is a little bit on the side. I thought that his points were exceptionally well made in regard to the removal of the gall-bladder, particularly in regard to the closure afterwards and keeping the stomach, pylorus and duodenum away from adhesions to the abdominal wall. It seems to me that is a very valuable thing when sufficient time can be taken and it can in nearly all of these cases.

DR. W. H. MAGIE, Duluth: This is a very interesting subject and I am very glad to hear this discussion. It seems to me that Dr. Mayo or any other surgeon cannot lay down a definite rule of drainage in a gall-bladder or in any other case. We surgeons come to these meetings for the purpose of discussing these subjects and get the view points of others upon these subjects. I think the responsibility rests not with Dr. Mayo in my case, but the responsibility rests with Dr. Magie in any given case as to whether he is going to drain that case. It is useless for us to try to lay down a rule that is going to be ap-

plicable to all gall-bladder surgery. That is why God Almighty has given us brains and he expects us to make use of them. We must discuss these subjects and settle them to our own satisfaction, according to the convictions we have received from experience we have had, though it may not be so great as the experience of some other surgeon, but the responsibility however rests upon us and our decision must be made at the operation table. I do not think there is any hard or fast rule that can be laid down as to the whether we should do a cholecystectomy or whether we should drain after a cholecystectomy has been performed. This question must be decided at the operating table.

DR. M. M. GHENT, St. Paul: When one listens to an artist like Dr. Mayo describing his removal of the gall-bladder, beginning at the lower end, it is very convincing, but for the occasional operator, I think that many times this work can be done easier starting at the fundus. Now gall-bladder surgery for me is very serious and it does not always show up the operative field as plainly as Dr. Mayo's pictures do. For myself, and I think for other operators who are not so clever with their hands, it is better to begin at the fundus of the gall-bladder. Teaching surgery is a good deal like a golf coach teaching golf. The coach may be the best player in the world and his strokes may be perfectly sound for him, but when he begins to try to teach them to the average players, he will find he never can make a golf champion out of them. For one who does not do a great deal of gall-bladder surgery, the gall-bladder can be taken out more safely beginning at the fundus.

DR. C. M. ROAN, Minneapolis: In this question of gall-bladder drainage and extirpation I feel that mention should be made of gall-bladder lavage such as I had the good fortune of seeing practised by Dr. Wessel of the Community Hospital, Copenhagen, a year ago this month. In selected cases Dr. Wessel opens the gall-bladder, removes the stones in the usual manner and follows this with a mild antiseptic lavage at body temperature. He thereupon closes the gall-bladder with silk sutures by inverting the edges. The abdomen is closed without drainage. This method Dr. Wessel had used for a period of three years, particularly in cases where there was no involvement of the pancreas and where there were no stones in the common duct. While I have not seen any report as yet in the literature on his work, he stated that he had had uniformly good results.

DR. C. H. MAYO (closing): Years ago in a discussion of the diagnosis and operative treatment of gall-bladder diseases I referred to the subject of quantitative and qualitative food dyspepsia in gall-bladder disease. Qualitative dyspepsia comes on within thirty minutes after eating. It is a reflex disturbance in the stomach when due to the gall-bladder disease, whether or not there are stones. Some type of spasm of the muscle of Oddi may possibly be the cause. It is stated that if the Einhorn



tube is passed from the stomach into the duodenum and a little sulphate of magnesia given through the tube, it will start a flow of bile. This has been developed by Meltzer and by Lyons. The cause of real trouble in the upper duodenum and stomach is ulcer or cancer of the stomach; other disturbances are reflexes from diseases of the nervous system, gall-bladder, pancreas, appendix. Most of the time the patients deny that foods disagree with them. Do not suggest to them that they have trouble with food of certain types, but say, "You have no trouble in eating raw apples, uncooked vegetables, salads, greasy and fried foods?" At least 90 per cent of patients with cholecystitis will say that they cannot eat these things. Quantitative food dyspepsia is caused by disturbance of the peristaltic action, usually one hour after eating, never within thirty minutes unless there is an obstruction high up, which may be due to gallbladder disease or neoplasm.

Before we attempt to cure gallstones their cause must be removed. Lipoid changes tend to produce gallbladder diseases. Such changes are found in the strawberry gallbladder and the fish scale gallbladder. Are we doing any better gallbladder surgery today than we did thirty years ago? Are we having the same mortality rate that we had thirty years ago? Are we adding any cholecystitis cases to this group? Thirty-eight plus per cent of cases of cholecystitis are without stones. All the cases of gallstones are associated with cholecystitis and gallstones reform in the gallbladder.

Years ago in cases of appendicitis we operated only after abscess had formed. Gradually we began to operate during intervals and we employed drainage even in clean cases because we were accustomed to drainage. Then we stopped drainage and the results improved. We have eliminated drainage in the pelvis, whereas we formerly employed it in every case of pus tubes. Fifteen years ago if a man, said, "I am closing the pelvis without drainage", we were convinced that he was taking a great chance. We have made marked advances. We should study our advances and see if they make any difference in the results.

I used to consider dissection of the gallbladder from the fundus to the neck a very complete operation, yet if dissection is started at the bottom one artery only needs to be dealt with. Occasionally a big gallbladder is in the way, but it may be drained with a trocar. Adhesions are annoying, but they can be freed. If a patient is very sick only the obstruction should be relieved and drainage instituted secondarily. In the Clinic we drain in most cases of stone in the common duct and in all cases we drain the peritoneum. Ten years ago we would not think of closing the abdomen without drainage in a case of diseased gallbladder. The results of no drainage, unless indicated, are good. Today we take out gallbladders. I have operated again and again in my own cases in which stones recurred after drainage.

A month ago I operated on a patient eleven years after we first removed the stones. All of them do not come back to us; some of them go to others. Jacobson found in his own clinic 4 to 6 per cent of recurrences in cases of stone in which the gallbladder had been saved. We cut our percentage of recurrences from 9 to 14 per cent down to slightly more than 2 per cent, when we began to remove gall-bladders for disease.

## PERITONITIS AND INTESTINAL INTUBATION\*

By ARTHUR N. COLLINS, A. B., M. D., F. A. C. S.  
*Duluth, Minn.*

In well defined diffuse peritonitis, there are clinical signs of intestinal obstruction. In well defined intestinal obstruction, we look for death to ensue, if the obstruction is allowed to remain unrelieved. Just why death ensues has given birth to many theories of cause of death but proofs have never been conclusive. Patients with partial peritonitis and partial obstruction frequently get well. Patients with general or diffuse peritonitis occasionally get well, but never without the restoration of patency of the intestinal tract, the resumption of peristalsis in some measure and the subsidence of clinical signs of intestinal obstruction.

The theories of cause of death in intestinal obstruction, summarized by Lane (JW) in 1917, include the supposition that loss of water is responsible, that a toxic substance is the cause, that this toxic substance is *not* a chemical poison and that the cause is due to some aberrant activity of duodenal and pancreatic cells. He cites the common observation that in acute general peritonitis the picture is practically the same as that at the end of intestinal obstruction.

Hertzler experimented particularly with turpentine, iodine and olive oil in the peritoneal cavity. With the first two, he found death to ensue before there was evidence of any injury to the parenchymatous organs. He found ice-water injected into the peritoneum fatal in a few moments in amounts not fatal when injected subcutaneously. In the first instance *chemical toxicity cannot be denied*. When ice-

\*Read before the Minnesota Academy of Medicine, October, 1920.

water is injected, death must be ascribed to so-called shock. That like results may be caused by acute infections, can not be denied or proved, in his estimation.

From the literature, we have to read into the theories of cause of death (1) the mechanical theory of stasis and toxemia, (2) or of incompetency of the ilcoecal valve and reflux of colonic contents into the ileum, (3) or of stenosis of the same valve, refusing passage of contents in the normal direction, (4) or of obstructive conditions of the sigmoid, (5) of perverted secretion of the mucosa et cetera and, while we may not gather much encouragement from the wide divergence of these many theories advanced from divers sources, we are at liberty to deduce from them all one common factor, namely that an intestinal toxin exists. What this toxin is and whether it is the sole or primary cause of death in peritonitis and intestinal obstruction, it is not incumbent upon us to prove for the purposes of the present discussion. We need no proof that the peritonitis per se furnishes some of the toxemia. Whether this, however, is sufficient to strike the death-dealing blow if the intra-enteric toxin can be eliminated remains to be seen.

Dragstedt, Moorehead and Bureky (1917) quote the oft repeated supposition that death in obstruction is due to toxemia. They admit the establishment of toxins *more toxic in the obstructed intestine* than in the normal intestine, but they assert that the toxins have not been shown in the blood in obstruction cases and from their experimental work they believe that the theory of dehydration of tissues is untenable, their claim being that there is no excessive vomiting of fluids. They conclude (the italics are mine):

1. That closed intestinal loops in which bacteria are first removed, are compatible with life.

2. That closed intestinal loops in which bacteria are present but in which tissue necrosis is prevented, are compatible with life.

3. That closed *aseptic* loops in which the blood supply is completely occluded are compatible with life.

Their belief, however, is that bacterial activity plus necrotic tissue, or the absorption of toxic products *resulting from the action of put-*

*refactive bacteria on necrotic tissue* is the important factor in the rapid death, in simple closed intestinal loops.

It is interesting to note the further observations of Dragstedt, McClintock and Chase in 1919 that the substances responsible for the toxemia in acute intestinal obstruction are produced by the *action of intestinal bacteria on proteins or their split products*. They observe that an injury to the intestinal mucosa, particularly that resulting from *disturbances of the blood supply to the intestine*, greatly facilitates the absorption of the poisons.

From the earliest times acute, diffuse or general peritonitis has been a most baffling scourage in the experience of the surgical world. I am constrained to quote Handley's graphic picture: "If there is a condition in surgery, which is stamped with the word 'hopeless' it is that stage of general peritonitis where, in spite of pelvic drainage, cessation of the passage of flatus and persistent foul vomit indicate that complete obstruction has supervened. The rigid abdominal muscles have been forced to yield by the pressure of fluid poured out into the paralyzed intestine and the abdomen is uniformly and tightly distended like a drum. The pulse becomes running, the extremities cold and the patient, measuring the condition by the abnormal clearness of his faculties, only within a few hours of the end, realizes with horrible certainty that he is in the inexorable grasp of death."

About 1890 and prior thereto, the mortality in peritonitis was very high indeed. Treves stated he was doubtful if a single human life had been saved by surgical interference in a genuine case of "peritoneal toxemia." Richardson, in a large number of cases of general peritonitis, verified by bacterial examination, stated that the results with hardly an exception were fatal in his hands under any method of treatment. Delorme is quoted as having operated on many cases of general peritonitis and as having lost all the patients. Dr. Halstead (Chicago) about 1906, said in discussion he considered it more good luck than good surgery when his patients recovered from general peritonitis and that if there was an intense infection, they were not susceptible to any curative



treatment, except in a few mild cases where the resistance of the patient was great.

About 1897, McBurney, McCosh, Abbe and Lockwood began to have better results. But even in 1917, Lane (JW) pointed out that intestinal obstruction and ileus resulting from peritonitis were still presenting extremely high mortality. McGlannan (1913) and Deaver (1915) were showing the mortality in intestinal obstruction to be over 50 per cent and in advanced obstruction almost 100 per cent, in spite of any treatment offered.

The mortality statistics for the reporting districts of the United States for 1918 show 9,733 deaths from appendicitis and typhlitis (which usually means peritonitis and intestinal obstruction as the terminal condition).

Peritonitis arises most frequently in the lower part of the abdominal cavity. Bell (1901) and Tilton (1906) are authority for the statement that appendicitis is the most frequent single cause of peritonitis. According to Tilton's statistics diffuse peritonitis originates in inflammation of certain abdominal organs in the following order of frequency; appendix, female generative organs, stomach and duodenum, remainder of the intestinal tract, gall-bladder, kidney and bladder. According to Bell, the *perforations* tend to beget generalized inflammations, with the exception of perforations of the appendix and of the gall-bladder, these latter showing a tendency to localize.

Handley showed in 1915 that the intestines below the horizontal level of the symphysis were paralyzed in cases of obstruction secondary to peritonitis, while those above this level, though distended, still retained their contractile power; that there are both large and small intestines in the pelvis and therefore two obstructions to deal with and this dual obstruction he terms "ileus duplex." He states that children especially do not always go on to the stage of obstruction, and he mentions one of his own cases—a boy of twelve. He calls attention to a stage preceding the hopeless stage, in which obstruction is complete but in which the pulse is still relatively good and the vomit has not become offensive. Rigidity is chiefly below the umbilicus. The upper half is softer and there we see slight respiratory excursions of the

abdomen. He calls this "the stage of deadly struggle but not yet of decisive defeat." Here he points out the hopeful indications:

(1) That general peritonitis is rarely universal.

(2) That general peritonitis usually begins at the lower limit of the peritoneal cavity and spreads gradually upward.

(3) That the persistent vomiting indicates that the stomach and upper bowel retain their contractile power to a late stage.

Hertzler observes that the first part of the gut to suffer from paralysis is usually the terminal ileum. Fortunately, the entire gut tract does not reach the same state simultaneously. The ileum may be paralyzed and dilated while the jejunum may retain its power of contraction. As a matter of fact, reversed peristalsis is often an expression of ileal paralysis with retained power of contraction in the jejunum and this must, in a measure, be purposive.

We come now to the subject of intestinal drainage and it appears from a perusal of the literature that as early as 1891, in England, and 1895, in the United States, intubation of the intestine was advocated by Paul and Mixer, respectively. Both advocated the use of a glass tube. In a personal communication, Dr. Mixer states he uses the tube "in many cases of diffuse peritonitis with paralytic distention, as a temporary measure, even tying the small tubes in the small intestine." Mixer observes in an earlier, printed, communication (1895) "how astonishing is the large amount of foul smelling liquid feces which may be removed from the distended coils of intestine, two quarts being not an enormous amount."

Van Arsdale in 1899 reported, with recovery, two cases of peritonitis treated by secondary enterostomy after primary drainage.

Lund reviewed the subject of intestinal paralysis in peritonitis in 1903 and advocated ileostomy, preferring to open above the ileocecal valve. He comments on the cecal operation and the advantage which is claimed for it; that enemata, cathartics and nutrients may be administered through the tube and states that the same may be administered into the small intestine. He records five cases with four

recoveries. Closure of the fistula is done as a secondary measure.

Greenough in 1904 advocated enterostomy on the ground that its great advantage is the drainage of gases and decomposing contents of the bowel and the relief of paralysis of peristalsis. By enterostomy the surgeon obtains direct control over the intestine for lavage and for the introduction of stimulants, nourishment, fluids and cathartics. He believes it is better done as a primary rather than as a secondary measure and he prefers the cecum as the point for enterostomy. In his cases the successes were nearly three times greater where primary enterostomy was done compared with those having had secondary enterostomies.

Lane (JW), on the other hand, in 1917 concluded from his experience of twenty years' observation, that death is due mainly to toxemia from retained intestinal products, whatever they are, and advocated and practiced *secondary* ileostomy for drainage.

In April, 1919, an important contribution to this subject was made by Hageboeck and Korneder who reported some interesting observations on fifty acute gangrenous and purulent cases with general peritonitis and no walling off. In ten, where the wound was left wide open for free drainage, a distended loop of intestine would present in the wound, become gangrenous and rupture spontaneously and discharge much gas and foul-smelling contents, sometimes as much as several pints. The patients improved and vomiting ceased. All recovered after draining freely for three to seven weeks. Secondary operations were done for closure. Of eleven other cases, with insufficient drainage, nine died. *The two recoveries had gut perforations.* It was observed that small portions of the bowel, almost always ileum and rarely colon, would angulate and become firmly matted together, being at the same time distended and gangrenous. Therefore, in the next seventeen cases, secondary enterostomies were done. These cases behaved similarly to those rupturing spontaneously. After evacuation of the foul smelling contents, improvement in the patient's condition resulted, distention was reduced, fecal vomiting ceased almost immediately and extreme prostration was replaced by a

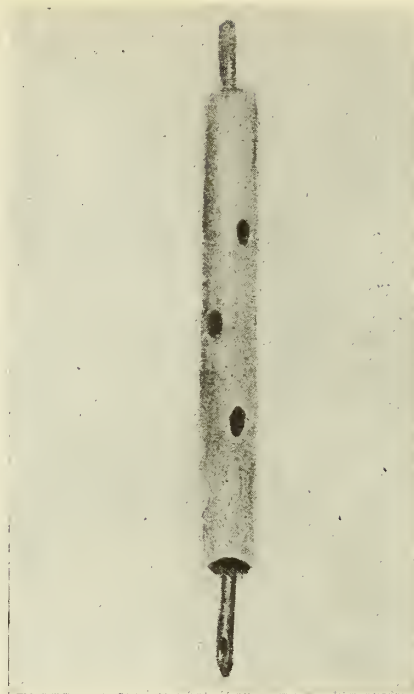
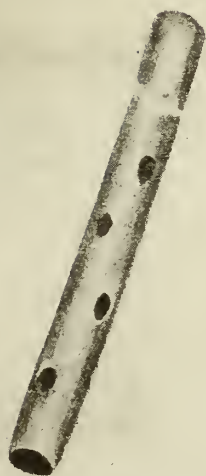
feeling of improvement, and cyanosis, rapid pulse and respiration became ameliorated. Secondary operations were performed in forty-seven cases with no mortality.

In September, 1919, Cooney reported his results with the use of a catheter which he inserted either through the appendix stump or through a stab wound in the cecum at the time of operation. He provided peritoneal drainage, and the wound, except for the drainage and intubation tubes was closed. He administers, through the catheter, one-half pint of saline or tepid water into the colon. The catheter is then clamped for one-half hour and then released and the intestinal contents allowed to drain into a bottle for one-half hour. This treatment is continued strictly for four or five days. Should there be abdominal distention after twenty-four hours, four to six ounces of Pluto Water are injected through the tube and repeated, if necessary, every twelve hours until action of the bowels takes place. The catheter begins to drain gas and often fecal material while the patient is on the table. Removal of the catheter is usually done on the sixth or seventh day following operation. In Cooney's series of twenty-two cases, all recovered but two. These died a few hours after operation. Prior to his use of the described method of treatment his cases died.

The composite picture produced by the experiences of these many observers seems fairly to show that the dread spectre of diffuse peritonitis is in reality the peritonitis itself plus an even more to be dreaded poisonous factor, resulting from the associated intestinal paralysis, namely *the decomposed fecal filth retained within the intestinal lumen.*

Before the bulk of the material presented in this communication was accumulated, I had used the method described by Cooney in the following two cases: The first, a young man of about twenty-five years, was run over by a truck, fracturing the pelvis and crushing the pelvic viscera. Within a few hours after injury the abdominal distention was increasing so rapidly that an abdominal section was decided upon and on opening the abdomen the cecum was found to be severely macearated but not perforated. To relieve the distention



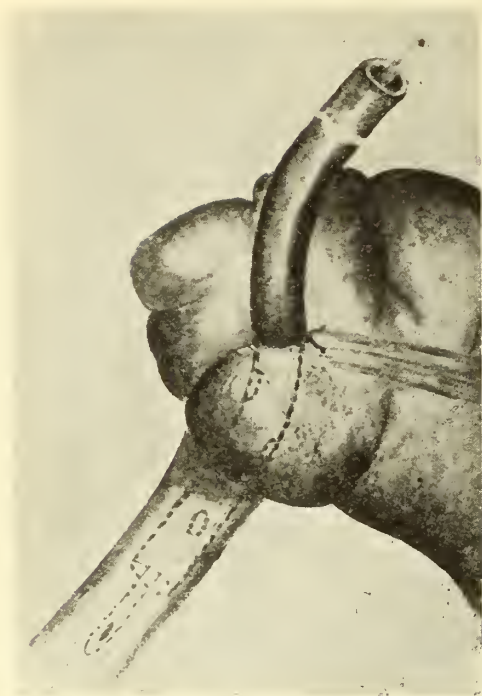


of the injured gut, a large catheter was inserted through the inverted stump of the amputated appendix and the wound was closed without peritoneal drainage. The distention was at once relieved and recovery was uneventful. The second case was one of advanced diffuse peritonitis resulting from a ruptured appendix, which came to my attention late. The same procedure was followed as in the preceding case, with the addition of peritoneal drainage and the wound partly closed. The foul fecal material drained through the tube at first and there was considerable reduction in abdominal distention. The patient was comfortable and improved for several days but grew worse and died. At autopsy the tube was shown to be held perfectly in place and with no leakage around it and the colon throughout its entire length was collapsed but the small intestine showed much distention and contained a large quantity of liquid feces. The ileocecal valve was contracted.

These observations led me to devise the following tube and procedure for its use: A large sized rectal or stomach tube or other non-collapsible rubber tube, with a quarter-inch lumen or larger, is used and quarter-inch windows are cut at intervals of about three quarters to one inch apart in the sides of the tube from tip to

about five inches above the tip. The customary purse-string is placed around the appendix base, the appendix amputated and the stump inverted. The tip of the tube is then pushed in through the sleeve of the stump according to the method of Cooney. The tip of the tube is then deflected slightly and guided through the ileocecal valve into the ileum and pushed forward, until the last or upper hole in the tube is well within and past the sleeve of the appendix stump. The purse-string is then drawn and tied about the tube and that part of the cecum is anchored by stitching to the peritoneum at the edge of the wound interposing omentum between gut and peritoneum. Peritoneal drainage is then provided as may be deemed necessary, the intubation tube occupying one angle of the wound, while the peritoneal drainage occupies the other angle. The holes in the sides of the intestinal tube provide vents for both the small and the large intestine. The ileo-cecal valve is thus held open.

Through the lumen of the intestinal tube a small sized rubber catheter, with blunt nose, may be introduced to the full length of the intestinal tube and even beyond the end of it into the small intestine, for the introduction, by funnel or syringe, of saline solution, or liquid nourishment according to the method of treat-



ment which may be desirable to follow. Gases and liquids have access to the outside from either small or large intestine by means of the perforations in the sides of the intubation tube. After the removal of the tube, the sleeve of the appendix stump collapses and healing takes place readily as in the inverted gall-bladder fundus following drainage. Should the sleeve of the stump be everted in drawing out the tube it should be at once inverted and that part of the would strapped together.

In summarizing the subject matter herein presented, the utter hopelessness of former days has given place to hopefulness of a decided nature, at the present time. Proofs of a toxin or of toxins of a specific nature, are still to be laid down, but practical demonstrations are accumulating showing surgical cures in diffuse peritonitis, by the elimination of pent up intestinal contents and the arrow seems to point toward the problem of obtaining a method best adapted to accomplish this end.

The method of intestinal intubation described above was evolved after a study of the conditions existing in peritonitis and associated intestinal paralysis. By this method it is possible to intubate that part of the intestine, namely the ileum, which is first involved in the paralytic process. The method is best adapted to the

early cases. By perforating the sides of the intubation tube a number of vents are provided for both small and large intestine. By inserting the tube through the ileo-cecal valve, spasm of that valve is overcome. If reflux of cecal contents into the ileum is a factor, the tube provides an outlet. Gaseous distention and fecal stasis have also, by means of the perforated tube, an outlet. If gaseous distention, with crowding of the intestinal loops, is responsible for the cutting off of the intestinal blood supply, as suggested by Dragstedt and his associates, with consequent gangrene of the intestine, any method which will reduce the gaseous distention should tend to offset this possibility. By means of the catheter within the tube it is possible to irrigate the small intestine or to administer medicaments or nourishment. Through the intubation tube it may also be possible, by lavage of the intestine, to make such experimental studies on peritonitis cases, during treatment, as may be necessary to establish more definitely the specific nature of intestinal toxins.

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## THE REPAIR OF HARE LIP AND CLEFT PALATE DEFORMITY\*

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At the outset I ask to be absolved from the charge of trying to suggest anything new in the consideration of this subject. Attention has been called to it by many of the most eminent surgeons of the world and a vast accumulation of literature is at hand for any one interested. I find in visiting clinics and meeting the men doing this work extensively that each has elaborated technical details and formulated rules governing his attitude toward these cases, all of which is in a sense individual.

So also in the work coming to me in private practice and through my affiliation with the University Hospital, through experience and suggestions therein encountered, I am now operating and viewing the individual problem upon the following basis: The general surgical considerations of this subject are founded upon the acceptance of three facts:

1. Hare-lip and cleft palate are not two distinct and separate entities, but simply a degree of failure of the same embryological process of fusion.
2. In formation of the face, closure takes place normally from before backward.
3. The bones of the face and mouth after birth do not become fixed or rigid under an arbitrary period of three months.

The first proposition is a broad interpretation of the embryological fact that the bones and overlying integument are formed from three

separate points of origin or rather several points of origin arranged in three groups. Of this fact arises the explanation of the number and degrees of combination in these defects.

So numerous and variable are they that to me the proper surgical procedure is somewhat confusing unless it is possible to simplify their consideration.

Consequently I have divided all cases into four groups based upon the combination of defects and the surgical measures required for repair.

Group I. Includes all cases of hare-lip, whether single or double or of any degree in which the alveolar arch is already intact.

Group II. Includes all cases of cleft palate, whether single or double and of any degree, in which the alveolar arch is already intact.

Group III. Includes all cases of single, complete hare-lip and cleft palate.

Group IV. Includes all cases of double, complete hare-lip and cleft palate.

I readily appreciate the fact that many objections may be taken to this grouping as not infrequently we see a hare-lip and cleft palate without involvement of the arch, but under such circumstances this case, in my opinion, will fall first in Group I and then in Group II, and so forth.

Now the whole question of surgical treatment, and the one which seems to me not to have been sufficiently emphasized, is definitely and positively influenced by the condition of the alveolar arch. If the arch be closed, the measures resolve themselves into comparatively simple procedures. If the arch be open singly as in Group III, or doubly with protrusion of the premaxilla, as in Group IV, the problem is then so enlarged as to afford most interesting consideration and debate.

### TIME AND SEQUENCE OF OPERATION

In Group I, the problem is purely cosmetic. It is true that, the defect causes difficulty in nursing of the new born, but artificial feeding is possible and satisfactory. Without associated defects no penalty is paid by delay in the repair, and operation is entirely a matter of convenience, and equal results obtained when done the first day, the first week, postponed until adolescence or later life. Performed with a minimum of shock and danger, it should and can

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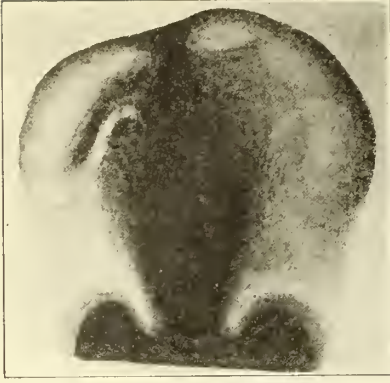


Fig. 1. (Berry & Legg). The whole question of surgical treatment is definitely influenced by the condition of the alveolar arch. If the arch be normally closed no matter what the defect is, fore or aft, the measures resolve themselves into simple operations, but if the arch is open singly as in the 3rd group or doubly as in the 4th group, then the problem is so enlarged as to permit of interesting discussions and debates.

be done as early as possible compatible with the condition of the child.

In Group II, the operation carries with it a greater traumatism, more difficult maneuvers, a longer procedure, more danger of blood loss and post-operative complication and hence requires a careful study of the age and general physical condition of the patient.

Phonation, intonation, and the various forms of our speech effects are herein so transformed as to render these people marked among their associates. The rule that the palate be closed before speech function is developed is proper. It can be done at any time of life, and even in adults, by care and development, wonderful results may be obtained. Before the end of the first year is quite satisfactory, but in selected cases by attention to a few details, I am closing the cleft at an earlier date.

Group III. The various debates as to the treatment of this Group gives rise to the question of sequence of operation. By reason of the alveolar arch hiatus, mechanical measures as typified in the Brophy operation have been suggested as primary procedures for its closure.

It is a clinical fact that these methods are efficient in closing the arch and narrowing the palate cleft, but as regards closing the cleft, added surgery is required. The method has, I believe, been misconstrued in general as being an operation on the palate, whereas, the effect so far

as I know and have seen, simply closes the arch. Mechanical measures are now generally questioned as to their necessity as it is easy to demonstrate that equal results may be obtained by first building the lip.

The second primary proposition is the embryological fact that normally the fusion of the face tissue takes place from before backwards.

It is most reasonable to me to believe that in the early foetus the mechanical effect of the lip by pressure upon the pliable unformed bones behind it materially helps in their fusion. So do we see this effect in the living baby as it is a constant experience to see the alveolar arch closed within ten days after the lip operation.

The third primary proposition, that the bones of the face do not become fixed under an arbitrary period of three months, is born out by this observation of lip pressure, and while mechanical measures also prove this fact, I believe they do not take into consideration the equal effects of the lip. Therefore, while in Group I. the first consideration is the cosmetic result, in Group III we have added the very important mechanical effect which I believe is the first consideration. Delay in operation allows the arch and maxillae to become set and leads towards a more difficult later operation on the palate. Therefore, I think I can say positively, distinctly, and definitely, that it is essential in the third group that the lip should be repaired at the earliest possible date, so soon as the baby is established, and preferably within the first 10



Fig. 2, Group 1. Single or double harelip, 1st degree, 2nd degree or any lip combination in which the alveolar arch is normally closed.





Fig. 3, Group 2. It is difficult to obtain photo of the 2nd group so am using a 3rd group case. If you will conceive that the lip is closed either normally or by previous operation and that the arch is normally closed, then any defect of uvula or hard palate, single or double, is described, and discussed as a 2nd group case.

days or two weeks. The palate to be done as in the second group.

Group IV brings up the same considerations as in the third with the added feature, that the lip repair is more extensive and is complicated by protrusion in various extent of the premaxilla.

Mechanical measures here also are employed dealing not only with the arches, but with the premaxilla. These have all been tried out with the conclusion that no more is accomplished than by the early closure of the lip.

The points then as regards age are:

Group I. Any time that is convenient; early



Fig. 4, Group 3. Single complete harelip and cleft palate or more properly described as an unilateral cleft of the alveolar arch, since this is the distinctive feature of this group from a surgical standpoint. It is in this group that mechanical measures are suggested as primary procedures; discussed in the text.



Fig. 5, Group 4. Double complete harelip and cleft palate or more properly described as bilateral cleft of the alveolar arch since the two sided defect is the distinctive surgical feature in which special steps are indicated, not present in the other groups.

operation giving better control of the baby and greater ease of accomplishment.

Group II. At the end of the first year, but possible owing to improved methods, to do earlier in selected cases.

Group III and IV. Essential to perform lip within first three months, preferably in first 10 days or two weeks because of its mechanical effect, the palate falling then into the consideration of the second group.

#### SURGICAL CONSIDERATIONS IN THE REPAIR OF THE LIP.

All lip conditions, whether falling in the first, third or fourth groups are repaired with attention to the following four principles:

1. Reposition of alae.
2. Approximation of the muco-cutaneous border.
3. A long lip.
4. A thick lip.

These points are made in the effort to accomplish the best possible cometic effect which is the end in view with the simple hare-lip.

In the third and fourth groups they are performed first for the mechanical effect on the arches and palate and second for the cosmetic effect.

There are many, many procedures for repair of the lip, to which the names of Nelaton, Malgaigne and six others are associated, each operation deviating from the other in some angulation or line of incision and denudation. At present the general attitude is that such steps are unnecessary and their use takes but little

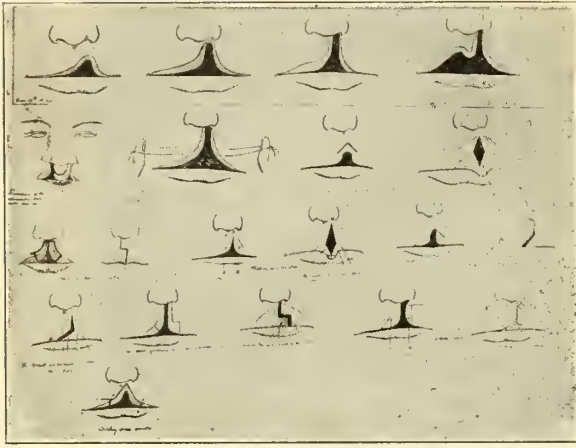


Fig. 6. Chart prepared by the late Dr. J. Clark Stewart. There are many procedures for the repair of the lip to which are attached the names of Nelaton, Malgaigne, Hagadorn, Golding-Bird and several others; each operation deviating from the other in some angulation or line of incision and denudation. Who of us has sufficient surgical acumen to select the proper operation for the individual case?

cognizance of the extraordinary mobility of the lip and cheek tissues. The fact that they may be moved widely makes a straight simple line denudation possible.

Every confidence may be placed in the viability of these tissues. It is most difficult to cut off their blood supply and they will stand in comparison with other body structure an unusual amount of suture tension.

In all plastic work upon the face and lip, union of wounds is enhanced by the appreciation of the fact that there are three separate layers of tissue: (1) the skin, (2) muscle and connective tissue, and (3) the mucous membrane. A stitch placed through all three, tends to contract any denuded surface. One of the very important features of the operation is the approximation of broadly denuded surfaces, and this is best accomplished by including the mucous membrane and muscle layers in one series of sutures, while the skin is approximated separately or the same result obtained by closing the mucous membrane by one line of stitches and the muscle and skin together as is always done in lower lip operations.

The acceptance of this principle then permits one a wide variation in the selection of suture material and methods of insertion. And there are many suggestions in this regard: Silver wire with shot to hold the nostril in position,

insertion of silk especially prepared, knots on the skin side, knots on the mucous membrane side, and so forth.

The point is that it seems to make but little difference what is used so long as the principle of two series sutures is used.

The accomplishment of reposition of the alae is the most difficult procedure, and the reason of failure is the lack of appreciation that the attachment of the wing of the nose to the mid-line is not a point but an approximation fully an eighth to a quarter of an inch, i. e. there is a well defined base to the nostril. Therefore one stitch, whether it be a retention suture or skin suture, cannot be expected to make this wide closure. Two stitches at the nostril are always necessary. I think the demonstration of this point has given me more satisfaction than almost anything else in connection with closure of the lip.

If we accept the statement that lateral angulations are unnecessary and straight line denudations are indicated, one can then follow easily the mucocutaneous border from the ala of the nostril towards the mouth corners, a sufficient distance, sometimes measured equally by dividers, and simply suture the lines laterally. In doing so, however, a wide surface of denudation is required, and an extra strip of mucous membrane is removed. The wider the strip, the thicker lip that results, the longer the lines of incision, the longer the lip.

In approximation of the muco-cutaneous border the main difficulty in the single lips is, that on the short side the mucous membrane tends to roll inwards; plenty of mucous membrane on the long side, not enough on the short, resulting in a cork screw effect. This usually corrects itself but can be controlled by extending the mucous membrane incision beyond the skin incision, sometimes leaving an uncovered area, which always heals.

In placing tension sutures I have elected to put them on the mucous membrane and muscle side, believing that main structure of the lip lies there and also because, with the denuded lip everted, a wide deep stitch can be accurately placed, embracing a definite positive bite of the muscle tissues, while the knots leave no scar, and should the stitches cut, no penalty is paid as wounds on this tissue readily heal. This per-





Fig. 7. A "Before and After" picture showing the wide distances that these tissues may be mobilized permitting straight line incisions and lateral approximation.



Fig. 8. (Same footing as Fig. 7.)

mits very fine approximation stitches in skin, of horsehair or a Dermol, with the assurance of a minimum of scar on the line of union.

I began by placing in a number of tension sutures, sometimes 5 or 6, but I believe three or four are only necessary, two at the nostril, close together, and one at the mucous membrane border, or in some cases one between.

The technical requirements are as follows:

1. Straight line incisions.
2. Wide denudation of the mucous membrane.
3. Two point suspension of the ala.
4. Two series sutures lines.
5. A clean wound.

Following this, various suture materials, methods and manner of insertion of them may be employed as selected by the individual operation. These principles apply also in closure of

the lip in the third and fourth groups. In double incomplete hare-lip of the first group, and double complete hare-lip of the fourth group there are several suggestions and illustrations which are for me personally impossible of accomplishment. Particularly those that bring again into use the right angular incisions. By their use I find that approximation is difficult and even when satisfactorily done, yield a lip that still is deformed in that it may be excessively long with a result that the mucocutaneous border is pulled to a marked degree under the pre-maxilla.

Several writers, notably Brown, have concluded that the right angle incisions are not proper and suggest in the double lips that each notch be repaired separately. This conforms to the first principles but it is my experience that it is most difficult to make a presentable vermillion border, and in those that I have attempted it was necessary to perform a secondary repair.

I have then in these cases compromised with myself by using straight line incisions in the form of a Y. The angulation on the pre-maxilla may be criticised as contrary to the first principle of technic mentioned, but at least the incisions are straight lines, and so far the closure is eminently satisfactory.

#### THE SURGICAL CONSIDERATIONS OF THE PALATE

Simple incomplete cleft palate is not infrequently an easy operation. Undertaken before the twelfth month a complete success is assured. When, however, repair is delayed until later life there are greater chances of failure, parti-



Fig. 9. A failure in group 3 due to infection used to show the straight incisions. The longer they are the longer the lip, the wider the denudation of the m.m. the thicker the lip.

cularly with the soft palate, which, having no function over a period of years, tends to atrophy, with the result that there is a minimum of tissue with which to work.

Closure of the cleft deals not with the palate bones but with muco-periosteal flaps, which are separated from the palate bone and swung from the alveolar arches, a trap door effect, known as the Langenbeck operation.

In this group as in the third and fourth groups Mr. Lane suggested that the flap on one side be cut from the alveolar arch, swinging from its attachment on the cleft margin and then sutured under the raised flap of the opposite side. On account of limited tissue and some of the very flat roofs, the Langenbeck procedure is impossible and the only method is that suggested by Mr. Lane. Leaving the palate bone denuded the appearance of the operative field is most discouraging, but in my limited experience the viability of these flaps is most extraordinary. The operation is not generally accepted as a routine procedure and surely the look of the resulting palate in no way compares to the old time methods. As a second procedure in closing holes following the ordinary operation, partial flaps are eminently successful.

The mobilization of the flaps is usually easily accomplished by elevators. The soft palate is separated and loosened by cutting sometimes through the posterior pillars. It is no uncommon experience to be able to bring the uvula almost to the front alveolar arch.

The first essential in cleft palate is relaxation.

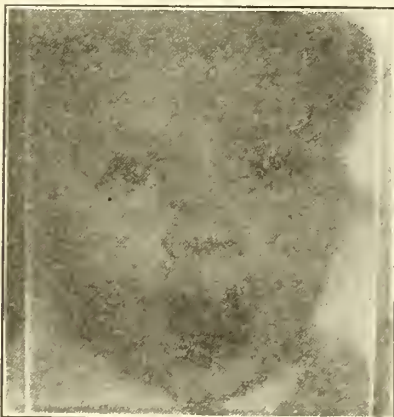


Fig. 10. The base of the nostril is  $\frac{1}{4}$  to  $\frac{1}{2}$  inch long. One stitch can hardly be expected to effect this wide approximation. Two stitches at the nostril, placed close together are indicated.



Fig. 11. The approximation of the muco-cutaneous border is sometimes difficult. In single lips of the first and third groups, on the short side, the m.m. tends to roll inwards resulting in a cork screw effect. Usually it corrects itself but can be helped by extending the incision on the m.m. further than on the skin.

It is an entirely different condition from that of the lip. The tissues are more friable and normally more fixed and unless tension is removed failure is certain. This has been long appreciated and to such a degree that every illustration of cleft palate work includes what seems to me enormous relaxation lateral incisions. I find that they are necessary in only about one-third of the cases and seldom to any such degree as ordinarily shown.

The second consideration is a wide approximation of denuded surfaces. Any attempt to simply bring together edges of the muco-periosteal flaps results in failure, because their edges are very thin and have a minimum blood supply.



Fig. 12. Any transfixation stitch tends to contract denuded surfaces, therefore two series suture lines are indicated. Tension sutures are placed on the mucous membrane side, permitting approximation stitches in the skin, a minimum scar resulting.





Fig. 13. In double lips of the first and fourth groups, there are several suggestions bringing in again right angle incisions. It is possible to close the lip but they often have a deformity too evident to be satisfactory.

There are several illustrations in the books and periodicals where this margin is cut away. But so far in my work this tissue is used and is important I think, in preserving the contact of the real palate. By everting this edge into the mouth by the use of the mattress stitch it is often that a definite raphe can be made which protects the tissues beneath.

The soft palate can be sutured readily. There is definite muscle structure. Mattress sutures do not seem to do well and I think, now, it is quite general practice to place single stitches on the mouth side and continue them around the uvula upon the nasal side, which is easy of ac-

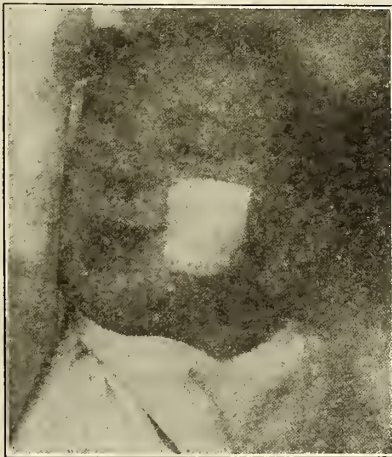


Fig. 14. This is the quite constant result in double lips of the first and fourth groups when the "Y" closure is made, building the lip high up on the premaxilla of the fourth group and single approximating denuded areas in the first group.

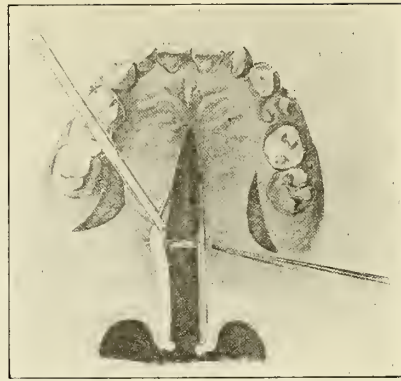


Fig. 15. Berry and Legg. It is difficult to illustrate operation steps on the palate while drawings may be misinterpreted. If the operation is undertaken before the fourteenth month or two year period and has been anticipated by early lip repair or the use of the Brophy method success is usually assumed. Most of my failures have been in the second groups which have been neglected.

complishment owing to the great relaxation possible to this tissue. All plates, wires, taps, and the like, are now obsolete.

The point of failure is at the junction of the hard and soft palate and may occur in any case and under the most favorable circumstances. Secondary operations are most satisfactory and it is in this situation that the partial lateral flaps, after the manner of Lane, are so successful.

Brown has anticipated this occurrence and suggests that only the hard palate be done at the first sitting. It is a constant observation that in many cases there seems to be more palate tissue as time goes on, and what seemed to be a very difficult closure at birth results in a really high-arched palate. It therefore seems a



Fig. 16. Berry and Legg. In the 4th group it has been suggested that the vomer be cut. If any such length be removed as illustrated here the lip will be so depressed as to leave a marked deformity. Often by strapping an early lip repair, the premaxilla will seek its normal relations to the maxilla, but usually the smallest nick in the vomer is necessary.



reasonable procedure to close the hard palate early and at a later date the soft palate and thereby anticipate the post operation holes. I have not as yet subscribed to this procedure but am quite favorably disposed.

The fourth group brings up special consideration dealing with the protruding pre-maxilla. This group carries with it the greatest deformity which is in some degree fortunate for the child, as I find that the parents will not permit delay and we get these babies at the earliest possible moment.

All principles hereto outlined apply to both the lip and palate. Mechanical and operative measures are suggested to relocate the pre-maxilla. The one step universally deprecated is the removal of this bone. The resulting deformity is so evident and marked as to be but little improvement on the original condition. This procedure is, however, still occasionally done by the uninformed, but is entirely unnecessary and cannot be too severely condemned.

It has also been the form to excise a V shaped piece from the vomer in order to allow the pre-maxilla to fall in contact with the alveolar arches. Illustrations are abroad in which the distance shown in which this vomer is excised, is extraordinary. Such maneuver will permit the pre-maxilla to go back so far as to present a similar condition to complete removal.

In many cases notwithstanding the seemingly wide gaps to be covered, it is possible to build the lip without touching the vomer at all. The lip bringing it back into position and even then in some cases too far.

In conclusion of this, my cursory paper, I will say:

1. That each individual case be immediately placed in one of four groups and that degrees of defect in that group be dispensed with as confusing and complicated.

2. That if the surgical principles as outlined in both lip and palate work be accepted, they permit of a wide variation in technical details.

3. That the constant clinical observation of the mechanical effect of the lip upon the tissue behind, in the third and fourth groups be accepted as all important as indicating earliest operation.

4. That plasticity of the bones of the face

holds to three months and in some cases longer and that this makes imperative early lip repair.

5. That the most reasonable basis of closure is to follow nature's path and form.

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#### DISCUSSION

DR. H. B. ZIMMERMAN, St. Paul: Dr. Ritchie told me he wanted to be absolved from trying to give anything new. This paper that Dr. Ritchie presented this morning is quite entirely new. The subject of closure of harelip and cleft palate is quite a remarkable one in that there has been so very little progress. There is no reason why there should not be. If the very first operator who tried to close a cleft palate or a harelip realized what he was trying to do, namely, that he was trying to make a normal face, he would have eradicated quite a number of the mistakes that are made in this operation. In other words, if he had taken a little inch rule and measured the distance from the tip of the nose to the lip and in the case of double harelip measured the distance from the premaxilla to the lip, he would find that he would make the nose more deformed by attempting to close the premaxilla. There is the same proposition in cleft palate. The deformity is a general one. The ala of the nose is plastered clear to one side and when it is replaced to the midline where it belongs the shortness from the tip of the nose to the premaxilla is not nearly so apparent.

Dr. Ritchie said that one of the essentials was to make a long lip. It has been my mistake usually to make too long a lip. I think Brown obviates

that by closing each side separately and not by making such a great attempt to close below the premaxilla; it makes too long a lip and makes an obvious deformity which we see too often in harelip. Dr. Ritchie laid stress, and rightly so, on bringing the alae of the nose with a thick flap to the midline and closing with two sutures. That is quite important. I think most people have not paid attention to that fact, that the alae must be brought to the midline. The ala of the nose is attached practically to the midline. That is one of the essentials in closing harelip, that is, to bring the alae of the nose to the midline. Having done this there is very little protrusion of the premaxilla. We occasionally see cases where the premaxilla has been crushed back or removed with the idea of being able to close the lip by lateral flaps. That is a grave mistake.

The first double harelip I ever operated on was about six or seven years ago at the University Hospital and the problem was what to do with this peak on the tip of the nose. I went over the literature and asked my chief in surgery at the University Hospital. His suggestion was to cut a V out of the deformed mouth. So I went at it with the idea of doing that, but first seeing what could be done so I would not take out too much. I separated the lip widely on either side and then took tension sutures to see how much I had to remove. I was surprised to see what a good anatomic result I got by bringing these flaps up to the premaxilla.

With regard to the closure of the palate, the Langenbeck procedure is not as satisfactory as the Lane procedure, because the latter causes much less liability to infection.

DR. GORDON B. NEW, Rochester, Minn.: Dr. Ritchie has given us a very complete and valuable resume of the present day treatment of cleft palates and harelips.

The child's lip should be brought together when it is between three and four months old, since a better cosmetic result is obtained than if the lip is closed when the child is a few days or weeks old. It is very difficult when the child is a few days old to get a good result on the nose and lips that does not require further operation. The bones of the face do not become fixed until about the third or fourth months. The pressure of the lip, if it is brought over the alveolar process, will bring the process together so that by the time the cleft palate is operated on the cleft alveolar process will be approximated.

In bringing the lip together I believe it is essential to make the nose a shade too small, because in a week or ten days the cartilage of the nose tends to spread out, thus making a widened nostril, the common deformity seen in cases of harelip. If the nose is made a trifle too small it will spread out to about the proper size.

In making the vermilion border it is wise to make it a little too full, otherwise when the wound heals

there will be a notch, which also is a common post-operative deformity of harelip.

Putting two silk worm stay sutures inside the nose is a valuable procedure, although if the nose is made a little too small they will hardly be necessary.

I believe the same procedures should be followed for double and single harelips. The premaxilla should not be touched but the lip should be brought together over it. The pressure of the lip brings the premaxilla back into good alignment. I do not believe that any mechanical procedures are necessary to accomplish the results if the child is operated on when it is three or four months old.

In cleft palate work I have followed the Langenbeck procedure except in double clefts, in very wide clefts, or in secondary operations. In these cases I have employed the Lane flap. I find often that the soft palate will come together with the Langenbeck method but I cannot get the hard palate together.

The wide free lateral incisions are to be condemned. If incisions are made as outlined in pictures in text-books, the posterior palatine artery will almost surely be cut across. As in any other plastic operation the blood supply is the important factor. If the main blood supply is cut in making the lateral incision there will probably be a sloughing of the flap.

To have the palate will freed up is the most important part in cleft palate operation. The hard and soft palates are attached to the posterior margin of the hard palate and cutting across the aponeurosis at right angles to the mesial margin of the cleft is necessary to allow the palate to come up into the mouth. The same procedure should be used in clefts of the soft palate. The palate should be closed before the child is fourteen months so that he may begin to talk with the palate closed.

DR. R. E. FARR, Minneapolis: I enjoyed Dr. Ritchie's paper very much but regret that I must disagree with him on one or two points which relate to the principles. The question of the proper manner of handling these cases always presents when a cleft palate baby is brought into the world. The question is: what advice must we give the baby's doctor? and, what course shall we advise?

The investigations of Mr. Keith, in England, showed that the loss of tissue in the palate in cleft palate cases averages about 3 mm., an amount so small as to be negligible. We therefore have little loss of tissue in these cases. We always have a deflection of the nasal septum, which carries the nose to one side, and a line bisecting the face will pass through the center of one of the alae instead of through the center of the nose. The cleft is due more to a separation of the lateral halves of the superior maxilla than to a loss of tissue. This led Brophy to the reposition operation with wiring. It is significant that Brophy and Blair—I talked with Blair within two months, and he is thoroughly in accord with the



method of reposition—who have done more of this work than anybody in this country, and the only men I have ever seen who did the wiring operation according to the method of its originator, are still satisfied with it.

I have had a number of cases present themselves for operation in advanced childhood or in early adolescence in which the lip had been closed in infancy. At a meeting at Faribault, a few years ago, I showed pictures of four of these in which the anterior portion of the cleft still admitted one finger and, of course, in no case can there be bony union after the surfaces are covered with mucous membrane. In every case I have seen where the lip only was closed in infancy the nose was deflected to one side.

At this time I desire to present a case on which the Brophy wiring operation was done two months ago. The child has just returned for the purpose of having the wires removed. This case illustrates what happens when this operation fulfills its function and I would like to have you gentlemen note that the nose lies exactly in the center of the face. Note the contact of the alveolar process in front, and note that the cleft, which remains to be repaired at the end of another year, is almost insignificant in its proportions. Note also the healthy condition of this child, which has gained 2000 grams since its operation.

I believe that the dissatisfaction with the Brophy method has come about largely through its faulty application. The wires have been placed too low and the alveolar processes have been tipped over, whereas the bones should be approximated.

DR. HARRY P. RITCHIE, St. Paul (closing the discussion): There is no effort to suggest anything new, but to rearrange known facts in what seems to me a more orderly fashion. There is no disposition on my part to find fault with the Brophy method. It does just what is claimed for it and the only question is, whether it should be used as a routine method in the third group. If men closing the alveolar arch by doing the lip first in sufficient time to close the palate within the 12 or 14 months or two year period, it brings up the question of the necessity of the mechanical measures. What I mean by a long lip is a lip made long enough to prevent some contraction which always occurs. The trouble in the 4th group is that the lip may be built below the premaxilla instead of upon it. When this is done, and the premaxilla recedes, the lip is found to be too long. But if the lip is not satisfactory it can be done over again, since the purpose of the lip in the 3rd and 4th group is primarily a mechanical effect on the alveolar cleft.

## HEMORRHAGIC DISEASE OF THE NEW-BORN.\*

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Though this disease is one of the oldest known to man, it has always been surrounded with much confusion, and our present knowledge of the ultimate cause is still incomplete.

As with many other syndromes in medicine, the nomenclature is complex and confusing. Melena, hemorrhagic diathesis, omphalorrhagia neonatorum, hemophilia neonatorum are but a few of the terms found in the literature. Names indicating the site of the bleeding have led to a further multiplicity of terms such as, purpura of the new-born, when hemorrhages occur in the skin; melena, bleeding from the intestinal tract; omphalorrhagia, bleeding from the cord; hepatic, adrenal, and cerebral hemorrhages. Unfortunately with so much emphasis on names characterizing the location of bleeding, the very fact that hemorrhages are usually multiple has been overlooked. Hemorrhage may occur in every organ and structure of the body and in varying combinations.

Warwick<sup>1</sup> reports that more than 50 per cent of the cases of hemorrhage occurring in the New-Born Clinic of the University of Minnesota have been multiple. At autopsy, hemorrhages have been found in the brain, lungs, liver, kidney, adrenals, skin, retina, and over serous and mucous surfaces. This is in agreement with Townsend's<sup>2</sup> observations which showed bleeding from the bowel and cord alone in only 22 out of 50 cases.

Lequeux<sup>3</sup> in his Paris thesis in 1906 gives a comprehensive review and bibliography of the subject. He illustrates the confusion and lack of knowledge by presenting four stages of historical interest and study:

1. Up to 1825. The period of confusion.
2. 1825-1835. The period of clinical study. Widely varying causes were cited. Too late tying of the cord had its supporters, while too early ligation was quite as warmly advocated as the cause.

3. 1835-1875. Pathological anatomical stud-

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.



ies revealed a variety of lesions such as embolism, ulceration, patent ductus arteriosus, and other congenital heart defects. These, when found in conjunction with hemorrhages, were naturally pointed out as the etiology of the bleeding.

4. 1875-1906. The period of laboratory study. This being the era of development of bacteriology, it was not strange that the cause of the hemorrhages should be laid to bacterial invasion of the blood stream. Many of the pathogenic bacteria were charged as agents of the disease. Gartner<sup>4</sup> in 1893 even claimed the discovery of a specific, hemorrhage-producing bacillus.

5. There can now be added a fifth period from 1908 to the present. Modern studies of the physiology of the blood, especially its properties of coagulation being the newer contribution—the causes of hemorrhages are sought in this field. It has also been suggested that certain changes in the vessel walls are involved in the disease.

Out of the chaos, Schloss and Commiskey<sup>5</sup> have brought a simple, understandable classification of hemorrhages in the new-born. Hemorrhages during the first days of life may be:

1. Traumatic—from obstetric or surgical procedures.

2. Accidental—as illustrated by insecure tying of the cord.

3. Spontaneous—without apparent cause.

Further, spontaneous hemorrhages may be classified as:

(a) Symptomatic—incidental to diseases as sepsis, congenital lues, or in the offspring of families showing true hemophilia.

(b) Idiopathic—which is to say, up to the present, without known cause. This paper deals with this latter type under the generic term "Hemorrhagic Disease of the New Born," as first suggested by Townsend.<sup>2</sup>

#### FREQUENCY.

The frequency of the disease varies within wide limits according to different observers:—Winkel,<sup>6</sup> Gerhardt,<sup>7</sup> Ribemont<sup>8</sup> report one case of hemorrhage in each 5,000 births, while Orłowsky<sup>9</sup> found the rate 1 to 116 births. This discrepancy arises from the fact that early observers took note only of the cases presenting signs of external bleeding, and overlooked those

with internal hemorrhages. Later writers, from closer pathological studies, find death in the new-born due to internal hemorrhages often when entirely unsuspected. From our experience in the New-Born Clinic at the University of Minnesota, with blood studies and careful autopsy control, we would say the incidence of hemorrhagic disease is one case in each 100 births. At any rate, the frequency is much greater than one would be led to believe from reports found in the literature.

#### SYMPTOMATOLOGY.

The symptoms depend largely on the extent and site of the bleeding. The onset is within the first eight or ten days, most frequently on the second or third day. There are usually no striking premonitory symptoms, restlessness and pallor first calling attention to the infant. The temperature is usually normal, though there may be temporary elevation. It becomes subnormal after an extensive hemorrhage. Presently may be noted the discharge of blood externally, emesis of blood and tarry stools (true melena), bleeding from mouth, nose, umbilicus, urinary tract, skin, or a rapidly growing cephalhematoma. Under these conditions, he who runs may read. However the hemorrhage may be obscure, and external bleeding may occur very late or fail entirely. There may be dyspnea with hemorrhages into the lungs, pericardium or pleural spaces; collapse, resulting from hemorrhages into the liver, adrenals or abdominal cavity, marked disturbances of respiratory and cardiac rhythm and vasomotor symptoms from the pressure of blood over the base of the brain, convulsions from a blood clot over the cerebral cortex. In fact, no more complex pictures of disease are found in medicine than in this malady.

#### ETIOLOGY.

It is a well known clinical fact that certain types of infections, such as streptococcic septicemia, produce tendencies to hemorrhages. The new-born offers no exception to the rule. This agrees with the observation of epidemic hemorrhages in new-born wards accompanying puerperal infections, as observed by earlier writers. The same cause was operative in Buhl's disease, and Winkel's syndrome which, thanks to better obstetrics, have passed out of our experience. Doubtless some cases of bacterial infection still occur and produce hemorrhages, but later stud-

ies show that much of the bacteriological theory is untenable. These cases show little or no elevation of temperature, nor other signs of septicemia, and once the bleeding is controlled, there is immediate recovery except for slight anemia. Lambert's<sup>10</sup> case of a classical and very severe hemorrhage showed instant recovery as a result of direct transfusion of the father's blood. Lues may operate as a cause in certain cases, as also the very rare gastric and duodenal ulcers. Likewise certain degenerative changes in the liver, as in congenital familial icterus, and phosphorus poisoning, produce hemorrhages. However all these conditions produce actual pathology demonstrable at autopsy, and the hemorrhage may be considered secondary or symptomatic. On the other hand in true hemorrhagic disease no pathological changes have been demonstrated except the uncontrolled tendency to bleed. Observation of unusual congenital lesions, as patent ductus arteriosus, and heart lesions, we now know to be no factors. Cerebral hemorrhage has been given as a cause, whereas, we now know it to be often a manifestation or symptom of hemorrhagic disease.

According to our present light, it appears that the latest theory as to the cause of hemorrhagic disease is the most tenable, namely changes in the blood or blood vessels. Further, I believe that the latter factor can be discarded. No gross nor microscopic changes have ever been demonstrated in the vessels. If the ultimate cause of hemorrhage resided in the vessel wall, it is difficult to understand results such as Lambert<sup>10</sup> obtained by transfusion of blood. One would rather anticipate that the blood introduced would continue to escape from the vessels.

Bowditch,<sup>11</sup> and Minot<sup>12</sup> and other early observers had noted the thin watery condition of the blood, its failure to coagulate normally and the futility of local measures in checking its flow. Schwarz and Ottenberg,<sup>13</sup> and Lucas<sup>14</sup> have observed impaired coagulation of the blood which they believe is due to a deficiency of some coagulation producing substance, or excess of an anti-clotting factor. If this is true, injection of normal blood or blood serum should overcome the disease. This has been demonstrated by various measures. Lambert<sup>10</sup> obtained striking results by transfusion, Welch<sup>15</sup> employed human blood serum with gratifying results, Leary<sup>16</sup>

obtained help from the use of animal sera. The injection of whole blood subcutaneously by Schloss and Commiskey<sup>5</sup> proved efficacious.

I believe the cause of hemorrhagic disease in the new-born is some physical or chemical change in the blood which produces delay and impairment in its coagulation properties, that the most constant findings in this disease are a delayed coagulation time and a protracted bleeding time. Further, these findings may antedate any symptoms by hours or days even. These changes may be the only signs of hemorrhage, external bleeding failing in many cases. Some conflicting results have been reported, which I believe are due to varying and unwieldy methods employed in performing coagulation tests, and lack of knowledge of the normal new-born coagulation and bleeding times.

Studies<sup>17</sup> of the new-born blood were undertaken in searching for an explanation of the very frequent finding of cerebral hemorrhage following normal deliveries where traumatic factors failed, and where bleeding was often multiple. A number of these cases showed delayed coagulation and delayed bleeding times. The results of the study I reported in the Journal of the American Medical Association, August 14, 1920.

The method<sup>18</sup> of determining the coagulation time which I employed is described in the American Journal of Diseases of Children, April 1920. It is very simple and capable of employment under the most primitive conditions. Briefly, it consists of collecting a freely flowing drop of blood in a clean watch glass, containing a clean No. 6 lead shot. The end point of coagulation occurs when the shot is caught up in the fibrin and no longer rolls. The bleeding time was obtained by Duke's<sup>19</sup> method. Our results in many hundreds of determinations on several hundred new-borns show the normal coagulation time range from five to nine minutes; the bleeding time from two to five minutes. In cases of hemorrhagic disease with varied symptoms such as cerebral hemorrhages, hematuria, melena, and multiple hemorrhages, we have found the time delayed many minutes and in some cases hours.

#### MORTALITY

With the older treatment of drug administration and employment of styptics and local measures, the mortality was high. In cases of un-



bilical hemorrhage, Furth reported a mortality of 100 per cent. Lequeux<sup>3</sup> in his monograph observed a mortality of 80 per cent. Numerous statistics vary from 32 to 100 per cent. With newer methods of treatment, this rate has been lowered very greatly. We have, however, no extensive tabulation from which to quote percentages. A very great factor in treatment is the duration of the disease, the earlier blood therapy is employed, the greater is the percentage of recoveries.

#### TREATMENT

In the treatment, we have employed blood by direct transfusion, injection into the superior longitudinal sinus, and subcutaneously. The two former methods are difficult, but best if there has been a great loss of blood. But if the hemorrhagic condition is recognized early, subcutaneous injection has proven entirely satisfactory. The technique requires a healthy donor, from whom blood to the amount of 30 c. c. is obtained by venipuncture, and this immediately injected under the infant's skin. For this method, blood grouping is not necessary. The injection is repeated every 6 to 12 hours until the bleeding is checked or the blood studies give normal findings. In our cases, we have succeeded in getting the bleeding and coagulation times down to the normal range.

#### CONCLUSIONS.

1. Hemorrhagic disease of the new-born is of frequent occurrence.
2. The disease depends upon changes in the blood which produce a delayed coagulation time and prolonged bleeding time.
3. We have a simple method for determining these factors.
4. Hemorrhages may be concealed; blood studies may give a clue to diagnosis earlier than other symptoms.
5. Blood therapy by subcutaneous injection is a simple and effective treatment, if employed early.
6. The coagulation and bleeding times should be determined in all new-borns presenting any symptoms.

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#### DISCUSSION

DR. MARTIN D. OTT, Minneapolis, Minn.: It has been my good fortune to see practically all the cases that Dr. Rodda has mentioned in his paper.

There are just a few points I wish to emphasize: first, as to the simplicity of the method itself. No special skill nor cumbersome apparatus is necessary. I am sure that when Dr. Rodda set out to devise the method he had no idea of devising a method which would give the accurate, scientific coagulation of the blood, but that of the new-born suffering with hemorrhagic disease. It has been very interesting to find that this has been just as accurate as the method accepted by White. The only factors necessary are the free flow of blood and absolute cleanliness. This has often been neglected in other methods and has caused them to fall into disrepute.



The apparatus is so simple it can be carried in any grip and takes no more room than the ordinary hypodermic outfit.

Cerebral hemorrhage is not uncommon, as Dr. Rodda pointed out, but the symptoms often do not point to any cerebral involvement. If hemorrhagic disease is present we have some idea of the process and if any untoward symptoms develop during the first few days of life we should make repeated examinations to determine if that condition is present.

Another important thing is using it as a guide to therapy. Heretofore, we have had no means of knowing when the therapy has been sufficient. When injections of blood have been repeated in some of the cases we have found that after one or two injections of blood the clotting time and bleeding time has returned to normal only to rise again the next day. It is important, therefore, to make repeated injections of blood or repeated blood studies to show when they should be repeated.

I think Dr. Rodda has made a very valuable contribution which, if carried out, will be instrumental in saving many thousands of babies in the future.

DR. J. C. LITZENBURG, Minneapolis, Minn.: This paper of Dr. Rodda's gives me no little satisfaction for the reason that the University of Minnesota was the first institution in America, and possibly in the world, to turn over the new-born child immediately after tying the cord to the pediatrician. Our reason for doing his was because we thought it was better for the child than to leave it with the obstetrician because the pediatrician was more interested in the child. I predicted at that time that because he was interested in the child he would probably make investigations that would increase our knowledge of the new-born. This paper of Dr. Rodda's bears out my point that the pediatricist, because he is a pediatricist, thinks in terms of the child and the obstetrician thinks in terms of the woman. We have heard a great deal in recent years as to child conservation. It seems to me very obvious that the best place to start this is in the beginning of child life. Too many babies are lost in the delivery room, or soon after delivery, so we are trying to improve obstetrics. We have heard much about prenatal care, but all this will be of no avail if the child is to die of hemorrhage soon after birth. I have had great satisfaction in seeing babies saved through this method of Dr. Rodda's that otherwise would have been lost.

I will cite just one case very briefly: A woman of forty-six was pregnant for the first time and probably her last chance to have a child. The child was born normally and was apparently in good condition, but soon the nurse reported that the child is passing bloody urine. Immediately the pediatricist was sent for and he injected whole blood and the baby was saved. This child passed such large amounts of blood and was in such precarious condition that repeated injections of blood were necessary. You can imagine my satisfaction in seeing the baby saved

by a method without which we would be entirely helpless, but can you imagine the satisfaction of the forty-six year old primipara with a fifty year old husband at the saving of the only child that they would probably ever have?

I do not know whether there are many here who realize that this is more or less of an epoch making paper. Not necessarily startling, but epoch making, because it is bringing to the attention of the profession a method simple and applicable by any one, a method that can be employed by the whole profession very easily. It is my practice in the University Hospital to turn the baby over to the pediatricist immediately after birth and in private practice I do the same thing. If there is anything the matter I want the pediatricist to see it. Suppose the child is bleeding from the cord, or from the urinary tract, or there are symptoms of cerebral hemorrhage, or what not. I have seen so many of these babies saved by these injections that I am very greatly impressed by this method, particularly so because it is a method that anyone can use. If you see any of these symptoms that I have mentioned you will find it of great value and any doctor can carry the two little watch glasses and the shot. Anyone can take the bleeding time. Dr. Rodda said that at the first symptom the bleeding and clotting time should be taken. That is my practice both at the hospital and in private practice to take the bleeding time in any case that has symptoms of hemorrhage, however obscure. We can stop them all.

I want to go a step further and make a prediction, and that is that it will be a very short time before it will be considered gross neglect not to take the coagulation time and the bleeding time in every baby at birth.

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## A PREOPERATIVE AND POSTOPERATIVE STUDY OF DIABETIC PATIENTS WITH SURGICAL COMPLI- CATIONS\*

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In 1915 I published a short paper on diabetes based on the study of a series of twenty-six patients who came to operation with a total mortality of 7.7 per cent. Since I wished to learn if our results continued to bear out the conclusions made in 1915 I have made a study of a much larger series, and the findings compare favorably with those in the earlier report. In considering the low mortality rate four signi-

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ficant factors should be borne in mind: (1) we have been forced to operate on very few patients with acute diabetes before bringing the diabetes under control; (2) light ether anesthetics have been given by the open non-asphyxiating method; (3) we have adhered to a program of selection and have attempted to eliminate from surgical procedures patients who have been demonstrated impractical risks from the standpoint of diabetes; and (4) most of our patients have had a mild form of diabetes. On the other hand, a large proportion of the patients have had major operations for serious conditions.

If the literature is reviewed from the standpoint of vital statistics very few observations are found based on a series of cases large enough to be conclusive. In my previous paper I referred to the series of cases collected by Phillips from the literature in which there was a mortality of 17.7 per cent in cases previously treated for diabetes. In Karewski's series of 136 cases there was a mortality of 16 per cent. The mortality in part of this series was 20 per cent (Addis). The mortality in operations on infected tissue was 21.7 per cent, in operations on uninfected tissue, 11.8 per cent. Fitz has recently reported a 28.7 per cent mortality in a series of forty-five cases. The mortality rate among the infected cases was 50 per cent, among the noninfected cases it was 12 per cent. It is scarcely necessary again to call attention to the very apparent increase of risk when there is infection at the site of operation.

The series herein reported comprises 159 separate operations performed on 134 persons. There were eight deaths from all causes; two patients died in coma, presumably of diabetic origin. The mortality based on 159 operations was 5.03 per cent, 25 per cent in coma; based on 134 patients it was 5.97 per cent. I am including tables of the findings of the patients under discussion with the pertinent data (Tables 1 and 2). The classification of the severity of diabetes has been made with special care not to designate as severe, a case in which observation under a dietary regime did not reveal an exceptionally low carbohydrate tolerance.

Ether was administered 104 times; six of the

deaths were among this group of patients, a mortality of 5.76 per cent; local anesthesia was used fifty-three times; two of the deaths were in this group of patients, a mortality of 3.77 per cent. Nitrous oxid was used only once. One operation of minor nature was performed without anesthesia. Joslin states that ether is a burden which may be easily born by a mild diabetic, but may change a moderately severe to a severe case, and a severe case to a fatal case, and earnest attention should be given to this opinion. It is farthest from my purpose to advocate the general and indiscriminate use of ether on diabetic patients, and yet I venture to repeat a statement made in a former paper that even in the presence of diabetes ether given under proper conditions is the general anesthetic of choice. The experience of the anesthetist in giving general anesthetics, the degree and time of the anesthetic, and the workmanship of the operator play a great part in success or failure with this anesthetic. We have not used spinal anesthesia and our observation of its use elsewhere has not made us regretful. Gas oxygen also is not used generally by our surgeons. It is not satisfactory to the operator in abdominal cases, chiefly from the standpoint of relaxation and consistency of action. The French have made rather wide use of ethyl chlorid as a general anesthetic, administered by a mask, and Labbe mentions its special applicability to the diabetic. The administration of chloroform to the diabetic patient is hardly excusable. Local anesthesia, when applicable, carries its own recommendation.

Only eight patients in the series were classified as severe diabetics twenty-three were moderately severe, and 103 were mild. Curiously enough all the deaths occurred in the mild cases. One patient who came merely for throat trouble in the course of a routine general examination was discovered to have diabetes. A tonsillectomy under local anesthetic was performed without the usual preoperative observation so that aside from the definite diagnosis no diabetic data is available. This patient died in coma forty-eight hours after the removal of the tonsils. Death occurred in six cases as the result of varied postoperative complications



rather difficult to associate directly with diabetes. It might be conjectured that in the two pneumonia cases resistance to the infection was lowered by a preexisting diabetes. The gas bacillus infection which occurred following a resection of carcinoma of the rectum seems to have been an accident unaffected by diabetes. The remaining three deaths are hardly open to discussion except from the standpoint of general surgical risk. With the exception of the death from tonsillectomy the deaths occurred in a group of cases in which the surgical risk would be appreciable without the presence of diabetes (Table 2).

If a detailed classification of the surgical conditions found in diabetic patients is attempted it may become rather complex. We find various and not necessarily conflicting ideas in the literature. Falta describes surgical conditions which tend to or already do bear a relationship to diabetes and those which do not. As a simple broad classification from one viewpoint this has an attraction. His description of the first group carries no implication relative to the cause of diabetes, but catalogs these surgical diseases as potential influences on diabetes. I should include in the first group all infectious conditions, including furuncle, carbuncle and gangrene, mentioned by him, and all definite affections of the gallbladder, bile passages or pancreas, and diseases of the thyroid. Our series included fourteen cholecystectomies, one cholecystostomy, one cholecystogastro-enterostomy for carcinoma of the pancreas, and one choledochotomy for stones in the common duct and pancreas. Our general impression has been that following a successful operation for conditions such as these just described the tendency has been toward improvement of the diabetes. It is also of interest to note that twenty-five patients of the series were operated on for diseases of the thyroid. Eight had exophthalmic goiters and seventeen had adenomas of the thyroid. Another grouping which appeals to me as rather essential divides the surgical conditions into the vital and the nonvital, with absolutely no relation to major or minor surgery. The first group comprises those conditions threatening the life or fundamental health of the patient immediately or

ultimately. Strouse mentions a classification of the emergency and nonemergency operations. This is rather important from the standpoint of its relation to preoperative treatment. I believe with Strouse and Fitz that delay may prove dangerous in acute infection, and if the infection is definitely shown seriously to disturb metabolism preoperative dietary measures are often unavailing and in fact add to the surgical risk.

In which diabetic patients do we expect the greatest hazard? Our mortality in operations on infected tissue was 8 per cent, and on noninfected tissue 4 per cent. Such conditions as nephritis, arteriosclerosis, old age, and obesity will contribute to the surgical hazard in proportion to their degree. To these may be added cardiac and circulatory diseases, debilitation from any cause, and the gravity of the surgical situation itself although unattended by any complication.

The majority of our diabetic patients coming to operation had the disease in a mild form, that is, their tolerance under a few days' management in shown to be 80 gm. or higher. Our first purpose in the preoperative treatment is to make careful investigation for associated conditions and complications, especially infections and renal disturbances, and second to render the urine free from sugar as rapidly as possible, establish tolerance roughly, bring the diet back to a maintenance caloric value and be sure the patient is free from acidosis. The details of this procedure in general are common knowledge; we are closely following the Joslin methods. Special attention is given to the number of days of starvation necessary to clear the urine of sugar, as well as the general effect on the patient of radical manipulation of the diet. Patients whose urine clears slowly and who complain of marked weakness and other distressing symptoms while starving are, if circumstances permit, carried on medical treatment for several weeks before being sent to the operating room.

We frequently are able to bring a patient to a satisfactory maintenance diet without reaching his carbohydrate tolerance. These patients may be saved considerable time as it is not necessary to drop back to a low diet and



again bring it up. The maintenance diet is kept up for several days, probably averaging about a week, after which, other things being satisfactory, the patient is transferred directly to the operating room. There is no fixed time limit to any part of the preoperative treatment, and the question of time is largely dependent on the aspect in the individual case.

Our requirements of the diabetic patient before operation are not new or different. We wish his urine to be free of sugar and that he show no sign of acidosis after he has been for several days (from five to seven) on a diet very low in fat and containing a sufficient caloric value to supply his needs while he is at rest. This requirement is not entirely an arithmetic calculation. I have seen diabetics who require at the least thirty calories to the kilo of weight, and I have had a moderately severe diabetic on half day and at times full day orderly duty for weeks on a diet which did not quite supply fifteen calories to the kilo. He maintained his nutrition and was fairly comfortable although he complained of weakness and slight dizziness.

Our routine urinalysis, aside from the ordinary tests, consists in the quantitative and qualitative analysis for sugar, the ferric chlorid test for diacetic acid, and the estimation of the total quantity of ammonia in the twenty-four hour specimen. A patient who excretes more than 1.5 gm. of ammonia, or shows a positive ferric chlorid reaction, should have more prolonged treatment. During the past year we have used routinely also the determination of the carbon dioxid of the blood plasma as an index to acidosis. Foster has stated that blood sugar is the index to diabetes. Although we have been determining the percentage of blood sugar for several years we have found it of especial value only in a very few cases in which we discovered that the blood sugar remained persistently high after the urine had become sugar free. We have not looked with favor on this type of patient as a surgical risk although one recent patient, not in the series reported, was dieted with the blood sugar as the sole index, and finally had an amputation of the leg for gangrene. This woman had a previous history of diabetes; our tests showed no sugar in the urine but 0.3 per cent of sugar

in the blood. There was some evidence of a kidney lesion but her kidney function was proved to be good. She passed safely through the operation.

In my former paper I mentioned our routine use of sodium bicarbonate, but for at least three years we have not used sodium bicarbonate for our surgical diabetics and, in all candidness, we see absolutely no consequent difference in the behavior of these patients during operation or in their postoperative convalescence. This about-face in our practice was due to Joslin's opinion that large doses of sodium bicarbonate are frequently detrimental to patients with threatened coma. Our great ally is fluid, by mouth, by rectum, and subcutaneously or intravenously, but fluid in some form immediately the patient leaves the operating table and pushed until the end of forty-eight hours or longer if thought necessary. All patients with signs of acidosis or threatened coma should receive 1000 c.c. of fluid during every six hours. For the first day or two orange juice up to 250 c.c. or 300 c.c. a day has proved a very acceptable and satisfactory form of food. We have found it beneficial as a source of carbohydrate to patients who have a tendency to acidosis. This has been especially true in young children who have reacted rather unfavorably to starvation longer than forty-eight hours. From this point on, our postoperative treatment has not differed greatly from our preoperative. Tolerance is again established and the patient is placed on a strictly medical regime which has for its object the education of the patient to a point where he may assume the responsibility of his future treatment.

Answers to questionnaires have been received from seventy-six of the 126 patients who recovered from operation and returned home. These replies were written from six months to five years following operation. Twenty-two patients died within an average of eighteen months after operation; six of these are reported to have died of diabetes, the remainder from various causes, several during the influenza epidemics. Forty-six of the remaining fifty-four patients consider themselves cured of the condition for which they were operated, six are considerably improved, and two report

no improvement. All but three or four are continuing more or less successful efforts at dieting, their successes depending a great deal on the circumstances in which they are obliged to live.

#### CONCLUSIONS

One hundred fifty-nine operations of all kinds have been performed in the Clinic on diabetic patients with a mortality of 5.03 per cent. Ether was administered 104 times, with a mortality of 5.76 per cent. The mortality in operations on infected tissue was twice as great as on uninfected tissue, and, judging from the literature, this is the usual ratio. Sixty-eight per cent of the seventy-six patients operated on, from whom we have heard, have obtained relief from various crippling, health-destroying and life-menacing conditions from which they were suffering aside from their diabetes.

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TABLE NO. 1  
One hundred and fifty-nine operations on diabetic patients.

| Case   | Age | Sex | Degree of diabetes | Operation  | Sepsis      | Anesthetic                        |
|--------|-----|-----|--------------------|--|-------------|-----------------------------------|
| 115441 | 50  | F   | Mild               | 9-22-14 Ligation left superior thyroid artery<br>9-29-14 Ligation right superior thyroid artery<br>5-19-15 Thyroidectomy   | 0<br>0<br>0 | Local<br>Local<br>Ether and local |
| 119774 | 58  | F   | Moderately severe  | 12-22-14 Enucleation right eye, Percy cautery to orbit for extensive cancer involving lids, canthus and eyeball<br>8-17-15 Exeision with Paquelin cautery two small epitheliomas outer canthus right eye | 0<br>0      | Ether<br>Local                    |
| 143189 | 33  | M   | Moderately severe  | 1-16-15 Ligation left superior thyroid artery<br>1-21-15 Ligation right superior thyroid artery<br>12-14-15 Thyroidectomy  | 0<br>0<br>0 | Ether<br>Local<br>Ether           |
| 122620 | 44  | M   | Mild               | 1-22-15 Ligation left superior thyroid artery<br>1-29-15 Ligation right superior thyroid artery<br>5-14-15 Thyroidectomy   | 0<br>0<br>0 | Local<br>Local<br>Ether and local |
| 122798 | 53  | F   | Moderately severe  | 1-29-15 Cholecystostomy, drainage pancreatic cyst  | 0           | Ether                             |
| 123150 | 46  | F   | Mild               | 2- 1-15 Choledochotomy, cholecystectomy, appendectomy<br>2-11-15 Choledochotomy, removal stones<br>6-14-17 Choledochotomy, removal stones  | +<br>+<br>0 | Ether<br>Ether<br>Ether           |
| 124214 | 36  | M   | Mild               | 2-27-15 Posterior gastrectomy for duodenal ulcer   | 0           | Ether                             |
| 126765 | 55  | M   | Moderately severe  | 3-29-15 Circumcision, hemorrhoidectomy   | 0           | Local                             |
| 129852 | 60  | F   | Severe             | 5-20-15 Extraction of cataract with iridectomy, left eye,  | 0           | Local                             |
| 129873 | 64  | F   | Mild               | 5-25-15 Cholecystectomy  | 0           | Ether                             |
| 131911 | 39  | F   | Mild               | 6- 1-15 Tonsilleectomy   | +           | Local                             |

\* Patient died in hospital.



Table No. 1—(Continued)

| Case    | Age | Sex | Degree of diabetes | Operation          |   | Sepsis | Anesthetic     |
|---------|-----|-----|--------------------|--------------------|---|--------|----------------|
| 131543  | 66  | F   | Mild               | 6- 9-15            | Radical amputation of breast for cancer   | 0      | Ether          |
| 132286  | 42  | F   | Mild               | 6-11-15            | Cholecystectomy, appendectomy   | 0      | Ether          |
| 133451  | 31  | M   | Moderately severe  | 6-28-15            | Inguinal herniotomy   | 0      | Ether          |
| 133835  | 44  | F   | Mild               | 6-30-15            | Abdominal hysterectomy, fibroid uterus  | 0      | Ether          |
| 134005  | 47  | M   | Moderately severe  | 7- 7-15            | Excision of cancer of right brow  | 0      | Local          |
| 133918  | 58  | F   | Mild               | 7- 7-15            | Removal of double ovarian cyst, both ovaries and tubes; appendectomy            | 0      | Ether          |
| 130169  | 55  | F   | Severe             | 7- 8-15            | Thyroidectomy   | 0      | Ether          |
| 134774  | 63  | F   | Mild               | 7-12-15            | Mikulicz-Hartman-Bilroth No. 2 for cancer of the stomach                        | 0      | Ether          |
| 769     | 49  | F   | Mild               | 7-27-15            | Herniotomy, umbilical hernia  | 0      | Local          |
| 136721  | 62  | M   | Mild               | 7-31-15            | Suprapubic drainage of the bladder  | 0      | Local          |
| 138001  | 53  | F   | Severe             | 8-20-15            | Thyroidectomy   | 0      | Local          |
| 141126  | 59  | M   | Severe             | 10-14-15           | Tapping of hydrocele  | 0      | Local          |
| 146905  | 44  | F   | Mild               | 12- 9-15           | Excision of tumor submaxillary glands, cancer                                   | 0      | Local          |
| 147832  | 42  | M   | Moderately severe  | 12-22-15           | Hydrocele   | 0      | Ether          |
| 147472  | 26  | F   | Mild               | 12-28-15           | Appendectomy  | 0      | Ether          |
| 149076  | 55  | F   | Moderately severe  | 1-25-16            | Exploration, general cancer   | 0      | Ether          |
| 150542  | 35  | F   | Moderately severe  | 2-18-16            | Cholecystectomy   | 0      | Ether          |
| 152350  | 52  | F   | Mild               | 3- 9-16            | Thyroidectomy   | 0      | Ether          |
| 62967   | 49  | M   | Mild               | 3-15-16            | Gastro-enterostomy for duodenal ulcer   | 0      | Ether          |
| 154837  | 55  | F   | Mild               | 3-25-16            | Thyroidectomy   | 0      | Ether          |
| 154524  | 17  | M   | Mild               | 3-28-16            | Appendectomy  | 0      | Ether          |
| 154245  | 55  | M   | Severe             | 4- 3-16            | Cholecystectomy   | 0      | Ether          |
| 156163  | 50  | F   | Mild               | 4-10-16            | Tonsillectomy   | +      | Local          |
| 157981  | 55  | M   | Mild               | 5- 3-16            | Cholecystectomy   | +      | Ether          |
| 158189  | 68  | M   | Mild               | 5-13-16            | Circumcision  | 0      | Local          |
| 159072  | 50  | M   | Mild               | 5-24-16            | Cataract, right eye   | 0      | Local          |
| 160174* | 29  | M   | Mild               | 5-26-16            | Tonsillectomy   | +      | Local          |
| 154378  | 54  | F   | Mild               | 5-30-16<br>6-14-16 | Thyroidectomy<br>Herniotomy, umbilical hernia<br>enucleation fibroid of cervix  | 0<br>0 | Ether<br>Ether |
| 161937  | 31  | M   | Mild               | 6-20-16            | Tonsillectomy   | +      | Local          |
| 163419  | 60  | M   | Mild               | 6-28-16            | Hydrocele   | 0      | Ether          |
| 160363  | 56  | F   | Mild               | 7- 4-16            | Right nephrectomy, hypernephroma  | 0      | Ether          |
| 162827  | 41  | M   | Severe             | 7-10-16<br>7-14-16 | Ligation left superior thyroid artery<br>Ligation right superior thyroid artery | 0<br>0 | Local<br>Local |

\* Patient died in hospital.

Table No. 1—(Continued)

| Case    | Age | Sex | Degree of diabetes | Operation  | Sepsis      | Anesthetic              |
|---------|-----|-----|--------------------|--|-------------|-------------------------|
| 162661  | 60  | F   | Mild               | 7-12-16 Perineorrhaphy   | 0           | Ether                   |
| 163382  | 40  | M   | Mild               | 7-14-16 Pyloroplasty for duodenal ulcer  | 0           | Ether                   |
| 170710  | 70  | M   | Mild               | 9- 1-16 Removal sequestrum right femur   | +           | Ether                   |
| 170844  | 33  | F   | Mild               | 9- 5-16 Ligation left superior thyroid artery<br>9-11-16 Ligation right superior thyroid artery                          | 0<br>0      | Local<br>Local          |
| 172215  | 57  | M   | Mild               | 9-14-16 Cholecystectomy, appendectomy  | 0           | Ether                   |
| 171566  | 64  | M   | Mild               | 9-21-16 Sack operation for hydrocele<br>3-12-19 Extraction cataract right eye  | 0<br>0      | Local<br>Local          |
| 172978  | 58  | M   | Mild               | 9-26-16 Thyroidectomy  | 0           | Ether                   |
| 124544  | 57  | F   | Mild               | 9-27-16 Hysterectomy, cancer uterus  | 0           | Ether                   |
| 55399   | 43  | M   | Mild               | 10-27-16 Tonsillectomy   | +           | Local                   |
| 175259  | 19  | F   | Mild               | 11- 1-16 Appendectomy  | +           | Local                   |
| 176239* | 55  | F   | Mild               | 11- 3-16 Thyroidectomy   | 0           | Ether and local         |
| 170213  | 39  | F   | Moderately severe  | 11- 8-16 Abdominal hysterectomy  | 0           | Ether                   |
| 179567  | 57  | F   | Mild               | 12-20-16 Cholecystectomy   | 0           | Ether                   |
| 180444* | 61  | M   | Mild               | 12-26-16 Herniotomy, inguinal  | 0           | Local                   |
| 183072  | 34  | F   | Mild               | 1-18-17 Bunion removed, right foot   | 0           | Ether                   |
| 182594  | 59  | M   | Mild               | 1-22-17 Submucous resection  | 0           | Local                   |
| 183515  | 59  | F   | Mild               | 1-29-17 Abdominal hysterectomy, cancer of uterus<br>2-15-17 Cholecystectomy  | 0<br>0      | Ether<br>Ether          |
| 183967  | 39  | M   | Mild               | 2- 8-17 Right herniotomy   | 0           | Local                   |
| 184721  | 33  | F   | Mild               | 2-21-17 Ligation left superior thyroid artery<br>3- 2-17 Ligation right superior thyroid artery<br>7-10-17 Thyroidectomy | 0<br>0<br>0 | Local<br>Local<br>Local |
| 189767  | 53  | F   | Mild               | 4- 5-17 Amputation of left breast for cancer<br>4-21-17 Subtotal abdominal hysterectomy, appendectomy                    | 0<br>0      | Ether<br>Ether          |
| 190768  | 59  | M   | Mild               | 4-19-17 Abdominal exploration, sarcoma mesentery   | 0           | Ether                   |
| 189925  | 48  | M   | Mild               | 4-21-17 Submucous resection  | 0           | Local                   |
| 191185  | 59  | F   | Mild               | 4-26-17 Caution to cervix, polyp   | 0           | None                    |
| 192082  | 53  | M   | Mild               | 5- 8-17 Cholecystectomy, appendectomy  | +           | Ether                   |
| 192580  | 51  | F   | Mild               | 5-12-17 Curettage, jaw, osteomyelitis  | +           | Ether                   |
| 194296  | 50  | M   | Mild               | 5-19-17 Tonsillectomy  | +           | Local                   |
| 192996  | 55  | F   | Moderately severe  | 5-29-17 Cholecystectomy  | 0           | Ether                   |
| 194400  | 62  | M   | Mild               | 5-21-17 Talma-Morison operation  | 0           | Ether                   |
| 194132  | 43  | F   | Mild               | 6- 5-17 Abdominal hysterectomy   | 0           | Ether                   |
| 200025  | 51  | M   | Mild               | 6- 6-17 Manipulation, shoulders  | 0           | Ether                   |
| 194569  | 54  | F   | Mild               | 6- 8-17 Cholecystectomy  | 0           | Ether                   |
| 196067  | 54  | F   | Mild               | 6- 9-17 Tonsillectomy  | +           | Local                   |

\* Patient died in hospital.



Table No. 1—(Continued)

| Case    | Age | Sex | Degree of diabetes | Operation            |  | Sepsis | Anesthetic      |
|---------|-----|-----|--------------------|----------------------|--|--------|-----------------|
| 197888  | 30  | M   | Moderately severe  | 6-16-17              | Enucleation left eye                                 | 0      | Local           |
| 133835  | 44  | F   | Mild               | 6-26-17<br>7- 9-17   | Subtotal abdominal hysterectomy<br>Cholecystectomy   | 0<br>0 | Ether<br>Ether  |
| 196666* | 20  | M   | Mild               | 6-29-17              | Thyroidectomy  | 0      | Ether           |
| 201643  | 44  | F   | Mild               | 8- 4-17              | Thyroidectomy  | 0      | Ether           |
| 204158* | 46  | M   | Mild               | 8-13-17              | Kraske, cancer of the rectum                         | 0      | Ether           |
| 209420  | 50  | M   | Mild               | 10-10-17             | Amputation of right breast for cancer                | 0      | Ether           |
| 214896  | 3   | M   | Severe             | 11-24-17             | Drainage, submental abscess                          | +      | Ether and local |
| 210583  | 53  | F   | Mild               | 11-30-17<br>11-27-18 | Thyroidectomy<br>Vaginal hysterectomy perineorrhaphy | 0<br>0 | Ether<br>Ether  |
| 192303  | 59  | F   | Moderately severe  | 12-13-17             | Perineorrhaphy                                       | 0      | Ether           |
| 216332  | 44  | M   | Mild               | 1- 2-18              | Excision lipoma of neck                              | 0      | Ether           |
| 219323  | 57  | M   | Mild               | 2- 9-18              | Cholecystogastrostomy, cancer of pancreas            | 0      | Ether           |
| 221020  | 48  | F   | Mild               | 2-12-18              | Splenectomy, splenic anemia                          | +      | Ether           |
| 223203  | 54  | F   | Moderately severe  | 3- 9-18              | Vaginal hysterectomy                                 | 0      | Ether           |
| 226214* | 57  | M   | Mild               | 4-10-18              | Suprapubic cystostomy                                | +      | Local           |
| 226665  | 33  | F   | Mild               | 4-18-18              | Appendectomy   | 0      | Ether           |
| 227529  | 64  | M   | Mild               | 4-20-18              | Amputation toe, gangrene                             | +      | Local           |
| 230597  | 57  | F   | Moderately severe  | 6-14-18              | Thyroidectomy  | 0      | Ether           |
| 227684  | 54  | F   | Mild               | 6-19-18              | Double cataract                                      | 0      | Local           |
| 221951  | 56  | M   | Mild               | 7- 5-18              | Herniotomy, inguinal                                 | 0      | Ether           |
| 39692   | 41  | F   | Mild               | 7- 9-18              | Thyroidectomy  | 0      | Ether           |
| 236692  | 50  | M   | Mild               | 7-15-18              | Cataract, right eye                                  | 0      | Local           |
| 238199  | 62  | F   | Moderately severe  | 7-17-18              | Drainage of abscess, toe                             | +      | Local           |
| 225159  | 66  | F   | Mild               | 7-31-18              | Cataract, right eye                                  | 0      | Local           |
| 238868  | 53  | F   | Moderately severe  | 8- 7-18<br>8-20-18   | Cholecystectomy<br>Excision portion of right breast  | +      | Ether           |
| 243207  | 59  | F   | Mild               | 9- 2-18              | Hysterectomy, fibroid                                | 0      | Ether           |
| 242720  | 23  | F   | Mild               | 9- 3-18              | Cholecystectomy, appendectomy                        | +      | Ether           |
| 244151  | 20  | F   | Mild               | 9-10-18              | Dilatation and curettage                             | 0      | Ether           |
| 245930  | 57  | F   | Mild               | 9-25-18              | Herniotomy, ventral hernia                           | 0      | Ether           |
| 248120  | 50  | F   | Moderately severe  | 10-23-18             | Thyroidectomy  | 0      | Ether           |
| 248296  | 69  | M   | Mild               | 11- 8-18             | Cataract, right eye                                  | 0      | Local           |
| 251508  | 57  | F   | Moderately severe  | 12- 5-18             | Hysterectomy   | 0      | Ether           |
| 253042  | 38  | F   | Mild               | 12-20-18             | Cholecystectomy, appendectomy                        | +      | Ether           |

\* Patient died in hospital.

Table No. 1—(Continued)

| Case    | Age | Sex | Degree of diabetes | Operation                      |  | Sepsis      | Anesthetic              |
|---------|-----|-----|--------------------|--------------------------------|--|-------------|-------------------------|
| 254250  | 43  | F   | Mild               | 12-28-18                       | Hysterectomy, prolapse   | 0           | Ether                   |
| 256509* | 62  | M   | Mild               | 2- 3-19<br>2-10-19             | Permanent colostomy, cancer of rectum<br>Posterior excision, rectum                                    | 0<br>0      | Ether<br>Ether          |
| 259627  | 68  | F   | Mild               | 2-25-19                        | Subtotal hysterectomy, ovarian cyst  | 0           | Ether                   |
| 259876  | 33  | F   | Mild               | 3- 7-19                        | Perineorrhaphy   | 0           | Ether                   |
| 262002  | 69  | M   | Mild               | 3- 8-19<br>11-24-19            | Suprapubic stab for bladder drainage<br>Prostatectomy, hypertrophy                                     | 0<br>0      | Ether<br>Ether          |
| 265477  | 54  | F   | Mild               | 4- 9-19                        | Vaginal hysterectomy   | 0           | Ether                   |
| 268038* | 39  | M   | Mild               | 4-29-19                        | Herniotomy, umbilical hernia   | 0           | Ether                   |
| 269070  | 44  | M   | Mild               | 5- 7-19                        | Combined extraction, cataract, right eye   | 0           | Local                   |
| 268790  | 59  | M   | Mild               | 5-10-19                        | Division posterior root right gasserian ganglion   | 0           | Ether                   |
| 269194  | 57  | F   | Moderately severe  | 5-21-19                        | Vaginal hysterectomy   | 0           | Ether                   |
| 271274  | 53  | F   | Mild               | 5-31-19                        | Thyroidectomy  | 0           | Ether                   |
| 274742  | 54  | F   | Mild               | 6-16-19                        | Extraction of teeth  | +           | Nitrous oxid            |
| 274621  | 64  | M   | Mild               | 6-26-19                        | Amputation penis, cancer   | 0           | Local                   |
| 201144  | 69  | M   | Mild               | 6-27-19                        | Amputation toe, gangrene   | +           | Local                   |
| 276951  | 66  | M   | Mild               | 7-17-19                        | Circumcision   | 0           | Local                   |
| 282214  | 54  | M   | Mild               | 8- 7-19<br>8-13-19<br>12-16-19 | Ligation left superior thyroid artery<br>Ligation right superior thyroid artery<br>Thyroidectomy       | 0<br>0<br>0 | Local<br>Local<br>Ether |
| 280168  | 54  | F   | Moderately severe  | 8-13-19                        | Thyroidectomy  | 0           | Ether                   |
| 238875  | 35  | F   | Mild               | 8-26-19                        | Vaginal hysterectomy, prolapse   | 0           | Ether                   |
| 285951  | 57  | F   | Mild               | 9-12-19                        | Thyroidectomy  | 0           | Ether                   |
| 288094* | 58  | F   | Mild               | 10- 1-19                       | Thyroidectomy  | 0           | Ether                   |
| 288735  | 33  | M   | Mild               | 10- 1-19                       | Removal of stones of the pancreas, choledochotomy, removal of stones from common duct, cholecystostomy | 0           | Ether                   |
| 287671  | 67  | F   | Moderately severe  | 10- 3-19                       | Amputation left breast for cancer  | 0           | Ether                   |
| 12578   | 48  | F   | Severe             | 10- 8-19                       | Combined extraction, cataract, right eye   | 0           | Local                   |
| 288864  | 44  | F   | Mild               | 10- 9-19                       | Thyroidectomy  | 0           | Ether                   |
| 247983  | 52  | F   | Mild               | 10-11-18<br>12- 4-19           | Combined extraction cataract, right eye<br>First stage Mikulicz operation, cancer rectosigmoid         | 0<br>0      | Local<br>Ether          |
| 291313  | 36  | M   | Mild               | 10-14-19                       | Bilateral herniotomy   | 0           | Ether                   |
| 291868  | 51  | F   | Mild               | 10-23-19                       | Amputation left leg, gangrene  | +           | Ether                   |

\*Patient died in hospital.



TABLE NO. 2  
Diaretic deaths in the hospital

| Case | Age | Sex | Operation   | Cause of Death                      | Anes-<br>thetic | Days<br>after<br>operation | Degree<br>of<br>diabetes | Sepsis | Associated<br>Condition  | Necropsy |
|------|-----|-----|---|-------------------------------------|-----------------|----------------------------|--------------------------|--------|--|----------|
| 239  | 55  | F   | Thyroidectomy   | Bronchopneumonia                    | Ether           | 3                          | Mild                     | 0      | Thyroid toxemia,<br>myocarditis  | +        |
| 366  | 20  | M   | Thyroidectomy   | Bronchopneumonia<br>and myocarditis | Ether           | 2                          | Mild                     | 0      | Thyroid toxemia,<br>myocarditis  | +        |
| 58   | 46  | M   | One stage Kraske<br>for carcinoma<br>of rectum  | Diabetic coma                       | Ether           | 4                          | Mild                     | 0      | 0  | 0        |
| 74   | 29  | M   | Tonsillectomy   | Diabetic coma                       | Local           | 2                          | Mild                     | +      | Multiple sclerosis   | +        |
| 214  | 57  | M   | Suprapubic<br>Cystostomy  | Pyelonephritis                      | Local           | 52                         | Mild                     | +      | Prostatic bladder<br>retention, marked<br>cystitis, low kid-<br>ney function | +        |
| 38   | 39  | M   | Umbilical<br>herniotomy   | Bilateral pulmonary<br>fat embolism | Ether           | 6                          | Mild                     | 0      | Marked obesity   | 0        |
| 509  | 62  | M   | Permanent colos-<br>tomy and poster-<br>ior excision of<br>rectum and anus<br>for cancer of rec-<br>tum | Gas bacillus<br>septicemia          | Ether           | 28                         | Mild                     | 0      | Moderate<br>cachexia   | 0        |
| 94   | 58  | F   | Thyroidectomy   | Bronchopneumonia                    | Ether           | 5                          | Mild                     | 0      | Thyroid toxemia  | +        |

## DISCUSSION

DR. EDWARD L. TUOHY, Duluth: It is to be regretted that Dr. Rowntree could not show his slides consecutively because he possesses a great fund of information and has had a large experience in the handling of these cases.

To my mind the average physician is easily overawed by the intricacies of the problem, and like many other technical procedures it is not so difficult when once actually started. From my own point of view, I have come to look on the handling of diabetes as being entirely satisfactory, where as formerly I looked back on it as being a sad event when anybody presented himself with that disease, chiefly for the reason that these patients did not seem to follow directions long enough to get more than transitory relief. Therefore, it seems that whatever else Joslin may have done, the feature of instruction of the patients and his relatively simple means of teaching them in classes has been an enormous step in advance. I have strongly recommended to those who are interested to get a series of his dietary directions and follow them out.

I recall a woman who had been in one of Joslin's classes for over a year and who moved to Ely, Minnesota. In speaking to that woman I found that she knew more about handling diabetes than anybody else I have ever met. She reminded me in a measure of a mother who has raised a sickly infant after following the plausible directions of a good pediatrician. She is oftentimes much better qualified to handle the

infant than the doctor with a prescription blank in his hand and a desire for speed paramount.

The situation I would like to ask Dr. Rowntree about is this: Since we have come to examine the blood for sugar and to study the situation of general metabolism, it seems to me we have run into one danger. Where are we going to draw the line in diagnosing renal glycosuria or draw the line in determining that the presence of sugar in the urine is only an incident in chronic interstitial nephritis or some disturbance of the glands of internal secretion.

Not long ago in one of his writings Joslin stated that renal glycosuria was an extremely rare condition, and that if these patients were followed long enough most of them would develop clinically diabetes. This is a matter of great importance because I have in mind two men who were advised by excellent clinicians to disregard their diet, although they had had glycosuria.

Some of the nerve men should discuss early changes which occur in the nervous system productive of weakness, malaise, paresthesias, a feeling of numbness, and what not, in diabetics. These two men complained not of polydipsia or of polyuria but complained of their limbs. These patients were very easily controlled. Their food tolerance was very high, and still on occasions they will have glycosuria. I would like to know for my own satisfaction how safe are we in telling any of these patients they are not in danger; that they do not need to watch their diet early. There must be a beginning in all condi-

tions, and what Dr. Rowntree has said is all very true. We ought to be interested in the early manifestations of the disease, and the earliest manifestations, as Mackenzie has pointed out, are indefinite. A close study of the subjective feelings must come into the foreground and be given the keenest analysis, particularly when we study diabetes from the standpoint of the general health. In the preliminary survey of every diabetic we should analyze his complete physical state, including the cardiovascular and the nervous systems. A very broad and intensive general examination is absolutely essential.

DR. HARRY B. ZIMMERMANN, St. Paul: One of the startling features in Dr. Berkman's paper is his low mortality. I am quite sure, although mine are not available, they must be higher.

One of the most interesting things I have recently seen on this subject is an assertion by Dr. Foster of New York that 70 per cent of all diabetics die following surgical operation. This illustrates the extreme susceptibility of diabetics to surgical complications and there is no doubt but that the diabetes is an important factor in the mortality of these cases. I have always felt that one should not operate on a diabetic, even after he has been put in the best possible condition by medical means, unless the surgical condition from which he is suffering is a greater menace to his life than the operation would be.

A great many of Dr. Berkman's cases were glycosurias associated with hyperthyroidism. These are not real diabetics and their faulty sugar metabolism is usually corrected when the excess of thyroid secretion has been removed.

With regard to anesthesia, theoretically ether anesthesia is not the anesthetic of choice. It has been proven that ether in itself, even when given with a minimum of asphyxiation, increases the H-ion concentration in the blood and asphyxia also tends to increase it, so if ether is given it should be given with extreme care with the least possible asphyxia. The post-operative vomiting so often associated with ether anesthesia precludes the post-operative treatment suggested by Dr. Berkman, namely the giving of excessive quantities of fluid. Of the general anesthetics, gas and oxygen is theoretically a better anesthetic than ether because gas gives a minimum of increased H-ion concentration.

When one is not operating on infected tissue, local anesthesia is the best. These patients have a certain amount of trophic disturbance and are quite susceptible to infection. It is my opinion that the trauma produced by a local anesthetic has a tendency to invite infection.

One occasionally sees cases in which the surgical condition seems primary in the production of the glycosuria. I recently operated on a woman of sixty-five with evidences of a cholelithiasis with a common duct obstruction. During the time that her common duct was obstructed she would run about six per cent sugar in her urine. Upon relief of the obstruction, she would be sugar free. The last time I saw her

it was necessary to operate to relieve the common duct obstruction and in spite of the fact that we got her sugar free by the Joslin treatment, she died three days after the operation in coma.

DR. R. E. FARR, Minneapolis: The subject has been so beautifully and thoroughly covered in its fundamentals that I shall only speak of one or two practical points. So many things are admitted that they do not need discussion—that is, preparation of the patient, in the first place, and, in the second place, the cases we should operate on. Of course, no one will do an operation upon a diabetic unless it is considered absolutely necessary. These things are pretty well settled.

One thing which I think is admitted by all is that a certain amount of lowering of the alkaline reserve takes place with all anesthetics, most with chloroform, next ether, then gas, and especially if the latter is poorly given.

With novocain, comparatively little work has been done on its relation to the alkaline reserve. For a year and a half Dr. M. E. Rose has been doing this work for me but our number of cases is so small, and statistics count for so little, that I hesitate to give the results. I want to leave this thought with you: Statistics and investigation show that novocain does less to lower the alkaline reserve than any other known anesthetic. It is surely admitted that we can do an operation under novocain with less injury to the patient's economy than can be done in any other way. The whole argument centers on whether or not we can do an operation under novocain anesthesia, with efficiency. If we do less trauma to the economy we have an argument in favor of using this anesthetic purely from a physical sense in our diabetics. I do not know enough about the scientific side of it to speak from my own knowledge, but, if the acidosis can be reduced, why should we not use in a diabetic, an individual predisposed to acidosis, the anesthetic that we know will do the least to raise the alkaline reserve?

I have been fortunate in my work on diabetics, but my number of cases is so small, compared with the number reported, that it would be absurd to present them, and they do not prove anything, anyway. A good deal would depend on how one selects his cases. In cases which are not infected I have not found infection to take place more often in diabetic cases than in any other class of people. In infected cases novocain does not increase the infection because one may do nerve blocking and, in most of these operations, we can resort to regional anesthesia and the novocain will have no more effect than as though we injected blood serum. You can do an amputation of the leg with nerve blocking six inches above the site of amputation and, in two days, you cannot tell where the anesthetic was given.

Dr. J. W. ANDREWS, Mankato: These cases that are most difficult to treat are of the greatest interest to us as physicians. It is not difficult to diagnose



diabetes mellitus, but when we come to the treatment it is a great problem.

I was impressed with many of the remarks made by Dr. Rowntree in the presentation of his paper, but more especially with the remark that we should have our patients in a hospital, and I want to emphasize that point. I have noticed in the treatment of these cases that those I had in a hospital and under training and under good nursing got along better and remained sugar free longer than those whom I had to treat at their homes. I have in mind one patient in a neighboring town in whose case I made a diagnosis of diabetes about three years ago. She came to consult me for something else and I found she had diabetes. When I announced that fact to her she wanted the best treatment that was known. I put her on the Allen treatment modified somewhat by the Joslin treatment. She became sugar free in a short time and remained so for weeks. Then it reappeared, not in any considerable amount. I put her on the treatment again and she remained sugar free for a number of months. A few days ago I received a specimen of her urine for examination and found it contained a large amount of sugar. I also received a letter from her stating that she had been feeling so well that she had been using all kinds of diet, sweets of all kinds, etc. Here is a fact: We can temporarily cure diabetes with this treatment that is under discussion here this morning, but I want to emphasize the word temporary. When we send these patients out sugar free, as we can in a large majority of cases, if they are not kept under observation the sugar will return. If they are not dieted to a limited extent the sugar will return and we have got the work to do over again. I hope that some one—and it may remain for our splendid man Dr. Rowntree to do it—will discover something that will permanently cure this distressing and so often fatal disease.

DR. HARRY A. BAKER, Minneapolis: I hesitate to enter into the discussion because of a limited clinical clientele, but take courage from the fact that oftentimes from a small number of cases that one has observed over a long period of time, one may gather data and information that might prove of value. This is particularly true of diabetes where patients seem to conveniently and at will present the symptoms of any disease that one would care to investigate, and where too, pharmaceutical houses with pamphlets and detail men with pills are always glad to furnish any knowledge that may be lacking.

I must differ somewhat with Dr. Rowntree in the statement that diabetes is incurable. Diabetes is curable, but with qualifications; it is curable as the inebriate is curable; as the drug habitue is curable; as tuberculosis is curable; firstly, by institutional treatment as has been outlined, where the benefits of psychiatrics as well as dietetics may be obtained; secondly,—and this is very important—rather than with follow up and later observations of recurrences, by a return wherever possible to an occupation and

an environment different from that in which the original disorder was contracted.

To my mind, glycosuria in whatever form save experimental, whether so called alimentary or renal, is incipient diabetes, or at least evinces a diabetic predisposition. I have never, either from clinical observation or a review of the literature, been able to directly connect the kidneys with diabetes save in the presumptive evidence of sugar in the urine. We must remember that the normal kidneys will filter out anything in the blood that ought not to be there, to the limits of their capacity, that they serve purely as internal emunctories and are neither the cause nor are they effected by the presence of sugar in the blood but rather a persistent hyperglycemia has a deleterious or toxic effect upon other tissues, namely nerve tissues and nerve centers, with possibly distant trophic disturbances.

The term diabetes is as antiquated as is consumption for tuberculosis. It signifies nothing save in its derivation being the name of a beautiful flower, the sweet pea. It suggests nothing either in etiology or treatment save perhaps desucration by diet, whereas it is equally if not more amenable to a psychotherapeutics. It carries with it in the mind of the patient the morbid psychology of an incurable ailment; a morbid psychology that handicaps therapeutics even more so than in Klebs, for while there is always hope in the tubercular, the diabetic sees nothing ahead but the bete noir of diet and restrictions. It would seem advance both for study and treatment, to consider all these cases either as incipient or advanced, true or false glycosurias.

It is a matter of much interest that these patients improved under the Doctor's treatment. The findings coincide with war reports from abroad that glycosurics were benefited too, by a military regime. That to me is one of the most important if not the most important simple, general medical truth that has been brought out by the war: the fact that regimen, including as it does, standardization of food, hours of work and time for play, is conducive to good health; a truth that is particularly timely and applicable in our own country, since the equally important economic fact is being demonstrated that liberty unless tempered with discipline and under certain restraint favors functional disorders and prepares the soil for nerve lesions.

There are several things of which I am wholly convinced: that diabetes is not a disease but a disorder; that there is no organic pathology but rather a glandular derangement; that the glandular triad involved is the pancreas, thyroids and adrenals; that the etiological factors of both glycosuria and Graves' are the same: predisposition and stress; that the right combination of both result in one disorder or the other. The glandular triad may be likened to the carburetor of an automobile: too rich a mixture or too lean a mixture, and the flivver spits, chokes and backfires; but give it just the correct mixture and Henry is himself again.

DR. L. G. ROWNTREE, Rochester (closing the discussion on his part): I have greatly appreciated this discussion. The question raised by Dr. Tuohy,—“How are we going to make a diagnosis in diabetes mellitus?”—is extremely important. Certainly in every case a routine physical examination and a careful history and repeated urinalyses are necessary.

The etiology, i. e., whether or not it has its origin in the pancreas, has to be taken into consideration in every case.

In reference to Dr. Baker's remarks, I feel that the kidney is probably the least important organ to come into consideration. Of course, we know that we get glycosurias in disease of the pituitary, in diseases of the liver, quite frequently in diseases of the thyroid, and often in diseases of the adrenals, or subsequent to the administration of adrenalin. Dr. Braasch and I observed a case together some two weeks ago, possibly a hyper-nephroma, with 6 per cent sugar in the urine. Obviously, a careful examination is most important.

In the treatment of diabetes the first essential is common sense. In the last case mentioned no attempt whatsoever was made to render the patient sugar free. Such an attempt, in the presence of this growth, would have endangered life, or enervated the patient so that we should never have gotten him out of bed again.

There is no question at all but that renal glycosuria is one of the rarest of diseases. I have seen only two cases. Instances have been reported in the literature from time to time, but a careful analysis throws out most of them. We diagnosed this renal glycosuria on the grounds presented.

I do not believe that true pancreatic diabetes is curable. In my paper I instanced a family type in which for a period of two to two and a half years, on an almost unrestricted carbohydrate diet, there was no recurrence of the glycosuria. There may be rare types that will respond to treatment, and in some cases the glycosuria may disappear permanently. But, in true pancreatic diabetes mellitus, I feel that it is a mistake to think we have effected a cure. We may have cured him, as Dr. Andrews says, temporarily, and in my experience of at least 200 cases in the last five years recurrence of glycosuria has been the constant rule.

In regard to Dr. Zimmerman's discussion, I feel as he does, that we need more information concerning acidosis from all forms of anesthesia. Dr. Farr has also indicated the same thing.

I want to congratulate Dr. Berkman on his contribution, since it is one of great importance. We all have had a great fear of ether in these cases. We have the experimental proof that small amounts of ether administered in normal saline to a normal animal, will produce glycosuria. King, of Baltimore, introduced intravenously dilute solutions of ether with the constant appearance of sugar in the urine. In contradistinction to this, we have from the Mayo Clinic incontrovertible evidence that in properly selected cases of diabetes mellitus which are handled

wisely prior to operation, the judicious use and skillful administration of ether permits skillful surgery to rid the patient of serious surgical complications and with a very low mortality.

Dr. Berkman laid emphasis in the proper place in regard to the handling of these cases for surgical procedures. The use of water is tremendously important, not only in surgical, but medical cases. During the period of starvation the forcing of water is one of the most important considerations.

In relation to Dr. Baker's discussion concerning the origin of the word, it is interesting to know that the word “Diabetes” was introduced in the second century by Aretaeus the Cappadocian, and signifies a syphon. He considered diabetes a form of dropsy in which “the defluxion is determined to the kidney and bladder”, thereby differing from the ordinary forms of dropsy. The word “mellitus” comes from Willis, who determined the presence of a sweet body in the urine from its taste, differentiating for the first time diabetes mellitus and diabetes insipidus, the latter not having a sweet taste and therefore being insipid. The presence of sugar was demonstrated in the urine a year later by Hodgson.

DR. D. M. BERKMAN, Rochester (closing the discussion): I wish to correct a misapprehension which arose in connection with the presentation of my paper. I mean that ether is the choice when a general anesthetic is indicated. I believe with Dr. Farr that when applicable, local anesthesia is really the anesthetic of choice. Any anesthesia, as he has stated, is limited in its possibilities by what the operator can do with it. Dr. Farr's experience with local anesthesia gives him the right to tell us a great many things about its use. In choosing an anesthetic it is a question of perfection of the operation which is to be attempted. Our mortality rate has been shown to be a little over 3 per cent from the use of local anesthesia, and about 6 per cent or a fraction under with the use of ether. That in itself is significant.

Another significant fact is that we had only two deaths from coma, one of which was after the use of local anesthesia, and one after the use of ether.

Dr. Zimmerman remarked about vomiting following the use of ether. I wish to repeat what I said that ether cannot be considered as an entity in speaking of anesthesia. The factors which enter into ether anesthesia lie beyond the ether itself; and they lie with the operator, in his technic, and in the manner in which the ether is given. At the Clinic ether is administered lightly. In diabetic patients special precautions have been taken, and we have had very little trouble with vomiting.

In cases in which fluids can not be given by mouth we have given fluid subcutaneously, intravenously, or by bowel. It has not been possible for us but it may be in the future, to make a comprehensive study of the exact chemical changes in the body in these patients during and immediately after operation. It is self evident that such a study is difficult to make except experimentally.



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## EDITORIAL

### LIQUOR AND THE DOCTOR

The medical profession has received a black eye because of its attitude towards the prescribing of liquor. For the most part promiscuous prescribing has been done by those with elastic consciences or none at all, for the fee attached (and often a handsome one at that) so that the practice of medicine in some cases has come to resemble high class bar tending. That a considerable element in the profession has been willing to cheapen their calling by abusing their privilege is perhaps not to be wondered at but the practice cannot be too heartily condemned.

The Volstead Law, adopted by our representatives in Washington, the representatives we voted for and who acted according to their best judgment (a judgment, by the way, which will be upheld if the question is ever submitted to popular vote) had for its object the elimination of alcoholic beverages. The medical value of alcohol taken internally being an open question, provision was made whereby the occasional patient who might, in the physician's opinion, be benefited, could be accommodated.

It is true that there is a strong public sentiment opposed to prohibition. It is also true that the average citizen has no qualms about breaking the law to the extent of taking a drink when opportunity arises. Rather strong pressure is

exerted at times when your friend wants a nip and you are in a position to furnish it. One way to avoid the situation is not to take out a license and this procedure is strongly recommended to those who have not the back bone to say no or wish to avoid unpopularity.

At first thought it would seem as though the present state of affairs would gradually adjust itself. As the stubs of the first prescription book are turned in, previous to the issuing of a second book, one would think that it would be easy to detect the law breaker. A crook is generally a good liar, however, and should be able to fake names and diseases with facility.

Most of us can practice medicine without prescribing spiritus frumenti and the like; for the same results can be obtained from alcoholic preparations which do not tickle the palate to the extent of over indulgence. It would be no tragedy if the privilege of prescribing alcohol in drinkable form were taken from the profession and we do not hesitate to predict that this will occur if the present disgraceful state of affairs persists.

### THE NEW EXECUTIVE SECRETARY

Every State Medical Association in the union has been at some time or other confronted with the problems of how to best handle their secretarial work. It is often difficult to find the M. D. who has the time, inclination and qualifications to handle the detailed work of such an organization as it should be handled. It is the consensus of opinion that the work requires a knowledge of business principles in which the average physician has had no training.

The various state organizations have handled the situation as best they could. The smaller states, being woefully lacking in membership and consequently funds, single out one of their number as more or less the goat and allow him to carry on the secretarial activities in any slipshod manner he pleases and even allow him to pay some of the necessary expenses out of his own pocket. The larger states, for instance Ohio and Virginia, having large memberships, hire a business man as full time executive secretary and allow him to accomplish results in a business like manner. While such a method seems dangerous to the more conservative mem-

bers of the profession, this scheme has worked well in the states mentioned.

Minnesota, with a membership of about fifteen hundred, is unable financially to adopt such a program, which, to some at least, seems ideal. If the profession of the state had a little more esprit de corps, appreciated the benefits of concerted action and if all desirables were numbered in the membership of the state association we would be able to employ a full time executive secretary and greatly increase the influence of the profession in the state. Unionism has proved its value and while of late has come into general disrepute because of abuse of its power, no one would be so bold as to predict any immediate danger of a strike on the part of the present organization of the medical profession. There are very definite indications, however, that there will be, in the not distant future a very serious need for organized action by the profession in state and nation if the present standing of the profession is to avoid a marked set back such as has occurred, notably, in England. It behooves every physician therefore to join his local society, adding his influence to the sum total.

Our state organization has induced Mr. J. R. Bruce, who has done so much for the Journal as business manager, to assume the additional duties of executive secretary. The work of the secretary and editor, which offices were combined at the last state medical meeting, will be materially lessened with the assumption by Mr. Bruce of the details of the business of the association in connection with the business side of the Journal at his office, 403 Central Bank Building, St. Paul.

### MINNESOTA MEDICINE ADVERTISERS

The whole field of advertising has evolved from the mere offering of things for sale, to a definitely higher level. While the advertiser utilizes the power of suggestion, repetition and surprise he goes still further. Advertising has become an art in itself. The advertising columns of many a magazine are more carefully edited, are more beautifully illustrated and are more interesting than the reading matter itself.

Advertisements are the pulse of the business world. Doctor, take the pulse of the medical

business world and go through the advertising pages of this journal. They will interest you. Our advertisements conform and have always conformed to the standards of ethical medical advertising established by the American Medical Association. This progressive step was one of the reasons for the establishment of Minnesota Medicine. If you see a thing advertised in this journal you can count on its reliability.

Our advertisers make the journal possible and should be patronized whenever possible. If a party advertises in our journal it is only turn about fair play to patronize him. If every subscriber when about to buy anything medical will first consult the journal advertisements and let it be known that he patronizes Minnesota Medicine advertisers, this department will increase and so will the size and importance of the journal.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### ALL-AMERICAN CONFERENCE ON VENEREAL DISEASE

A conference was held in Washington, D. C., December 6th to 11th, 1920, under the auspices of the United States Interdepartmental Social Hygiene Board, the United States Public Health Service, the American Red Cross and the American Social Hygiene Association. This conference will add impetus to the fight against the Great Red Plague being waged by these organizations. Dr. William H. Welch of Baltimore is president and Dr. Allen Winter of Washington the executive secretary.

### THE MINNESOTA STATE REGISTERED NURSES' ASSOCIATION

The Minnesota State Registered Nurses' Association, held its annual meeting at the Wilder Building in St. Paul, October 21 and 22, 1920. There were delegates from all Districts and the total attendance was more than three hundred.

It was decided last year to divide the State into five Districts and the activities of the Association during the past year have been centered chiefly on the completion of these District Organizations. This has been accomplished. The Second District has as its center Duluth; Third District, Minneapolis; Fourth District, St. Paul; Fifth District, Mankato, and Sixth District, Rochester. The Third and Fourth Districts are conducting central registries.

The morning of the first day was given to the Council meeting and the afternoon to Section round tables. At the League Section, a paper by Miss



Rankeillour of the Nurse Examining Board, who had inspected a number of Training Schools throughout the State, proved the need of a regular inspector. At the Public Health Section, there were interesting discussions on the different branches of Public Health Nursing.

At the evening meeting which was held at the Young Women's Christian Association, Miss Williams, of the League of Women Voters, gave an instructive talk on the State issues and balloting. This was followed by an informal reception.

At the business meeting on the 22nd, a report from the State Examining Board showed that 478 nurses had been granted registration during the year. There was considerable discussion on the subject of legislation. It was decided to defer legislation until 1922, and begin work on a new bill at once. The Association pledged \$15.00 towards a full time Secretary for the State Association and the State Board of Examiners.

The report of elections was as follows:

President—Miss Irene English, N. P. Hospital, Brainerd.

First Vice President—Miss Louise Pewell, University Hospital, Minneapolis.

Second Vice President—Miss Florence Whipple, Mankato.

Third Vice President—Miss Louise Schneller, Duluth, Public Health.

Secretary—Miss Sophia Olson, City and County Hospital, St. Paul.

Treasurer—Miss Irene Johnson, Swedish Hospital, Minneapolis.

Director—Miss Frances Brink, Minneapolis, Public Health.

Director—Miss Minnie Paterson, Wells Memorial Hospital, Minneapolis.

Miss Schneller, of Duluth, President of Second District, extended to the State Association, an invitation to hold its next annual meeting in Duluth.

#### NORTHERN MINNESOTA MEDICAL SOCIETY

The Northern Minnesota Medical Association was formed at a joint meeting of the Park Region, Clay-Becker and Red River Valley societies at Fergus Falls, September 29th. Realizing the need for a regional society to care for the profession in the north-western part of the state this society was launched and will hold its first meeting in the spring at Detroit. The following officers were elected: Dr. Theodore Bratrud, Warren, president; Dr. Victor E. Verne, Moorehead, vice president, and Dr. Williard L. Burnap, Fergus Falls, secretary-treasurer.

#### ST. PAUL CLINIC WEEK

The scientific program will be given Tuesday afternoon and Wednesday evening. Dr. W. J. Mayo of Rochester, Dr. B. W. Sippy and Dr. Joseph Beck of Chicago will give the Tuesday afternoon program. Dr. George W. Crile of Cleveland and Dr. B. H. Orn-

doff of Chicago will give the Wednesday evening program. Titles of papers to be announced later.

The Minnesota Academy of Ophthalmology and Oto-Laryngology will have a dinner on Tuesday evening. Dr. Joseph Beck of Chicago will be the guest of honor.

MEDICAL OFFICERS, watch bulletin boards for special information. "GET TOGETHER" and "ARMY MESS", Tuesday evening, 6:30 at Fort Snelling. Lt. Colonel Rutherford has invited Surgeon General Ireland to attend.

On Thursday evening there will be a reception by Governor Preus and state officials at the State Capitol, followed by an informal dancing party and other social festivities at the St. Paul Hotel.

Entertainment for the ladies is being arranged.

It is suggested that on account of the large attendance expected it would be advisable to make hotel reservations without delay through the executive committee, 1300 Lowry Bldg., St. Paul, Minn.

A schedule of clinics and demonstrations for the following day will be posted on bulletin boards at headquarters not later than 5 p. m. on the day previous. Daily printed bulletins issued every morning will also give a list of clinics for the day.

Headquarters at the St. Paul Hotel.

#### PROGRAM FOR CLINIC WEEK, ST. PAUL, JANUARY 10th-15th, 1921

Schedule of Clinics, Monday January 10th, 1921  
9 to 12 A. M.

##### Bethesda Hospital

Dr. O. W. Holcomb, Room 1—Surgical Clinic.

Dr. H. E. Binger, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. C. O. Olson, Room 2—Second Period Surgical Clinic.

Drs. Gillette & Chatterton, Room 3—Orthopedic Clinic.

##### City and County Hospital

Dr. Paul D. Berrisford, Room 3—Eye, Ear, Nose and Throat Clinic.

Dr. A. E. Comstock, Room 2—Surgical Clinic.

Dr. A. R. Colvin, Room 1—Surgical Clinic.

Dr. L. E. Daugherty, Room 5—Surgical Clinic.

Dr. C. D. Freeman, Room 4—Urological Clinic.

Dr. T. L. Birnberg—Pediatric Clinic.

Drs. Taylor and Geer, T. B. Annex—Tuberculosis Clinic.

Dr. Carl B. Drake, Ward—Medical Clinic.

Dr. W. S. Fullerton, X-ray Laboratory—X-ray Demonstrations.

##### Miller Hospital

Dr. Harry Zimmerman, Room 1—Surgical Clinic.

Dr. J. F. Hammond, Room 2—Gynecological Clinic.

Dr. C. Eugene Riggs—Neurological Clinic.

Dr. J. S. Gilfillan—Medical Clinic.

Dr. O. B. Chandler, X-ray Room—Fluoroscopic Demonstration.

Dr. M. Warwick, Path. Laboratory—Pathological Demonstration.

#### Mounds Park Sanitarium

Drs. Robert and George Earl and Associates—Surgical Clinic, Radium and X-ray Treatments; Oral Infections and Surgical After-treatments.

Dr. G. Kvitrud and Associates—Demonstration of Routine Wassermann and General Laboratory Technic.

#### St. Johns Hospital

Drs. Paul and John Kelly, Room 2—Surgical Clinic.

Dr. F. B. Morrissey and Dr. A. Kaplan, Room 1—Medical Clinic.

#### St. Josephs Hospital

Drs. O'Brien and Teisberg, Room 1—Surgical Clinic.

Dr. Arnold Schwyzer, Room 2—Surgical Clinic.

Dr. W. C. Carroll and Staff, Room 3—Surgical Clinic.

Dr. A. W. Hilger, Room 4—Nose and Throat Clinic.

Dr. Thomas McDavitt, Room 5—Eye and Ear Clinic.

Dr. Arthur Sweeney, Nurses Lecture Room—Neurological Clinic.

#### St. Lukes Hospital

Dr. C. L. Larsen, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. Chas. N. Hensel—Medical Clinic.

#### St. Pauls Hospital

Dr. E. M. Jones, Main Operating Room—Surgical Clinic.

Dr. H. N. Klein—Genito-Urinary Clinic.

#### State Hospital for Crippled Children

Dr. Warren Dennis, Room 1—Surgical Clinic.

#### University Hospital

Dr. Harry Ritchie—Surgical Clinic.

MONDAY, 2 to 5 P. M.

#### Bethesda Hospital

Dr. E. G. Sterner, Room 1—X-ray Demonstration.

#### City and County Hospital

Dr. Harry Zimmerman, Room 1—Surgical Clinic.

Dr. John L. Shellman, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. L. W. Barry, Delivery Room—Obstetric Clinic.

Dr. E. M. Hammes, Room 3—Nervous and Mental Clinic.

Dr. O. A. Groebner, O. North Ward—Contagious Clinic.

Dr. G. B. Kramer, Morgue and Laboratory—Autopsies and Pathologic Demonstration.

#### Miller Hospital

Dr. F. E. Burch, Room 1—Eye Clinic.

Dr. E. T. F. Richards, Room 2—Medical Clinic.

Dr. O. B. Chandler, X-ray Room—Plate and Radio-graphic Demonstration

Dr. M. Warwick, Laboratory—Frozen Section Demonstration.

#### Mounds Park Sanitarium

Dr. Chas. Ball—Neurological Clinic.

Drs. Robt. Burns and A. Leitch—Medical Clinic.

Dr. G. Kvitrud and Assistant—Blood Chemistry and Basal Metabolism.

#### St. Johns Hospital

Drs. Albert and Adolph Ahrens, Room 2—Surgical Clinic.

Dr. H. N. Klein, Room 1—Skin Clinic.

Dr. E. L. Kannary, Room 3—Genito-Urinary Clinic.

#### St. Josephs Hospital

Dr. H. G. Wood—Medical Clinic.

Dr. Chas. N. Hensel—Medical Clinic.

Dr. B. H. Ogden—Medical Clinic.

#### St. Lukes Hospital

Dr. E. L. Warren, Room 1—Nose and Throat Clinic.

Dr. John Armstrong, Room 2—Dermatological Clinic.

Dr. Edward Schons, X-ray Room—X-ray Technic

#### State Hospital for Crippled Children

Dr. Robt. Earl, Room 1—Surgical Clinic.

Miss Jenson—Mechanical and Gymnastic Clinic for correction of deformities.

#### Free Dispensary, 1 to 3 P. M.

Dr. W. S. Howard, Room 1—Medical Clinic.

#### Wilder Charity, 1 to 3 P. M.

Dr. Jennette McLaren, Room 1—Diseases of Infancy.

Dr. J. D. Geissinger, Room 2—Infant Feeding.

Dr. G. K. Hagaman, Room 3—Infant Feeding.

TUESDAY, 9 to 12 A. M.

#### Bethesda Hospital

Dr. V. N. Peterson, Room 1—Surgical Clinic.

Dr. O. I. Solberg, Room 2—Surgical Clinic.

Dr. E. G. Sterner, Room 2, Second Period—Surgical Clinic.

Dr. K. C. Wold, Room 1, Second Period—Eye, Ear, Nose and Throat Clinic.

#### City and County Hospital

Dr. J. C. Brown, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. M. M. Ghent, Room 2—Gynecological Clinic.

Dr. J. F. Hammond, Room 3—Gynecological Clinic.

Dr. E. V. Goltz—Medical Clinic.

Dr. A. R. Hall—Medical Clinic.

Dr. G. K. Hagaman—Pediatric Clinic.

Dr. W. S. Fullerton, X-ray Room—X-ray Demonstrations.

#### Miller Hospital

Dr. J. L. Rothrock, Room 1—Gynecological Clinic.

Drs. MacLaren, Ritchie and Daugherty, Room 2—Surgical Clinic.

Dr. J. S. Gilfillan—Medical Clinic.

Dr. O. B. Chandler and Assistants, X-ray Room—Fluoroscopic Demonstrations.

Dr. Margaret Warwick, Pathological Laboratory—Routine Laboratory Work.



**Mounds Park Sanitarium**

Dr. C. Eugene Riggs—Nervous and Mental Clinic.

**St. Johns Hospital**

Drs. F. J. Plondke and Staff, Room 2—Surgical Clinic.

Dr. T. L. Birnberg, Room 1—Pediatric Clinic.

**St. Josephs Hospital**

Drs. Carroll, Wood and Dunn, Room 1—Surgical Clinic.

Drs. Schuldt and Neher, Room 3—Surgical Clinic.

Dr. Arnold Schwyzer, Room 2—Surgical Clinic.

Drs. Comstock, Rutherford and Gruenhagen, Room 4—Surgical Clinic.

Dr. J. S. White, Room 5—Nose and Throat Clinic.

**St. Lukes Hospital**

Drs. Lerche and Kittleson, Room 1—Stomach Clinic.

**St. Pauls Hospital**

Dr. Egil Boeckmann—Eye, Ear, Nose and Throat Clinic.

**State Hospital for Crippled Children**

Dr. C. C. Chatterton—Orthopedic Clinic.

Dr. Walter Ramsey—Pediatric Clinic.

WEDNESDAY, 9 to 12 A. M.

**Bethesda Hospital**

Dr. C. L. Larsen, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. J. T. Holcomb, Room 2—Surgical Clinic.

Dr. V. N. Peterson Room 2, Second Period—Surgical Clinic.

**City and County Hospital**

Dr. W. W. Lewis, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. Paul Kelly, Room 2—Surgical Clinic.

Dr. H. M. Lufkin Room 3—Gynecological Clinic.

Dr. W. C. Rutherford, Room 4—Surgical Clinic.

Dr. E. T. Herrmann—Medical Clinic.

Dr. Peder Hoff—Medical Clinic.

Drs. Taylor and Geer—Tuberculosis Clinic.

Dr. H. Klein—Genito-Urinary Clinic.

Dr. T. L. Birnberg—Pediatric Clinic.

Dr. J. F. Fulton—Eye, Ear, Nose and Throat Clinic.

Dr. W. H. Hengstler—Neurological Clinic.

Dr. W. S. Fullerton—X-ray Demonstration.

**Miller Hospital**

Dr. Warren A. Dennis, Room 1—Surgical Clinic.

Dr. Harry J. O'Brien, Room 2—Surgical Clinic.

Dr. John T. Rogers, Room 3—Surgical Clinic.

Dr. E. M. Hammes—Neurological Clinic.

Dr. O. B. Chandler, X-ray Laboratory—X-ray Therapy.

Dr. M. Warwick and Assistants, Laboratory—Basal Metabolism.

**Mounds Park Sanitarium**

Drs. Robert and George Earl and Associates—Sur-

gical Clinic, Radium and X-ray Treatments, Oral Infections and Surgical After-Treatments.

**St. Johns Hospital**

Drs. H. Nippert and Bock Room 1—Medical Clinic.

Dr. Leo Hilger, Room 2—Surgical Clinic.

**St. Josephs Hospital**

Dr. J. L. Rothrock, Room 1—Gynecological Clinic.

Dr. E. M. Jones, Room 2, Second Period—Gynecological Clinic.

Dr. W. C. Carroll and Staff, Room 3—Surgical Clinic.

Dr. Arnold Schwyzer, Room 2—Surgical Clinic.

Dr. Chas. McNevin, Room 4—Surgical Clinic.

Dr. H. J. Rothschild, Room 5—Eye and Ear Clinic.

Dr. Haldor Sneve, Nurses Lecture Room—Nervous and Mental Clinic.

**St. Lukes Hospital**

Dr. A. R. Colvin and Associates Room 1—Surgical Clinic.

Drs. Paul Cook and Chas. Freeman, Room 2—Urological Clinic.

**St. Paul Hospital**

Dr. C. B. Teisberg—Surgical Clinic.

**State Hospital for Crippled Children**

Dr. Wallace Cole—Operative Orthopedic Clinic.

WEDNESDAY, 2 to 5 P. M.

**City and County Hospital**

Dr. Albert Ahrens, Room 1—Surgical Clinic.

Dr. J. L. Shellman, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. M. H. Knauff, Room 4—Orthopedic Clinic.

Dr. A. G. Schulze, Delivery Room—Obstetric Clinic.

Dr. C. A. Olson, North Ward—Contagious Clinic.

Dr. E. M. Hammes—Nervous and Mental Clinic.

Dr. G. B. Kramer, Morgue—Autopsies.

**Miller Hospital**

Dr. F. E. Burch, Room 1—Eye Clinic.

Dr. Arthur Sweeney—Nervous and Mental Clinic.

Dr. O. B. Chandler, X-ray Room—Plate and Radiographic Demonstrations.

Dr. Warwick and Assistants, Laboratory—Laboratory demonstrations, Frozen Sections, etc.

**Mounds Park Sanitarium**

Dr. E. J. Engberg—Nervous and Mental Clinic.

Drs. Robt. Burns and A. Leitch—Medical Clinic.

Dr. G. Kvitrud and Assistants—Blood Chemistry and Basal Metabolism Demonstration.

**St. Johns Hospital**

Dr. Sam Ziegler, Room 2—Oral Clinic and Surgery of the Jaw.

Dr. A. Kaplan, Room 1—General Laboratory and X-ray Demonstrations.

**St. Josephs Hospital**

Drs. A. E. Comstock, Rutherford and Gruenhagen, Room 1—Surgical Clinic.

Dr. R. G. Allisón, Room 1—X-ray Demonstration of Gastric and Duodenal Ulcer.

#### St. Lukes Hospital

Dr. Chas. Lyman Greene.

Dr. J. W. Chamberlin and Louis A. Nelson, Room 1—Eye Clinic.

Dr. Edward Schons, Laboratory—X-ray Technic.

#### St. Paul Hospital

Dr. A. C. Potter—Teeth Extraction. Why it has failed. A rational procedure for handling infected cases.

#### State Hospital for Crippled Children

Dr. Chas. Ball—Neurological Clinic.

#### Free Dispensary

Dr. E. M. Hammes, 1 to 3 P. M.—Nervous and Mental Clinic.

#### Wilder Charity Building

Dr. Jeanette McLaren, Room 1—Infant Diseases.

Dr. J. D. Geissinger, Room 2—Infant Feeding.

Dr. G. K. Hagaman, Room 3—Infant Feeding.

#### Fort Snelling Hospital

Col. H. H. Rutherford, M. C., U. S. A.—Routine Treatment of Genito-Urinary Conditions in the Army.

#### University Hospital

Dr. E. T. F. Richards—Medical Clinic.

Dr. L. W. Barry,—Obstetric Clinic.

THURSDAY, 9 to 12 A. M.

#### Bethesda Hospital

Dr. K. C. Wold, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. E. W. Ostergren, Room 2, Second Period—Surgical Clinic.

Dr. O. W. Holcomb, Room 3—Surgical Clinic.

#### City and County Hospital

Dr. H. E. Molzahn, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. John Abbott, Room 2—Surgical Clinic.

Dr. E. M. Jones, Room 3—Gynecological Clinic.

Dr. C. B. Teisberg, Room 1, Second Period—Surgical Period.

Dr. J. D. Geissinger—Pediatric Clinic.

Dr. W. H. Hengstler—Nervous and Mental Clinic.

Dr. J. A. Lepak—Medical Clinic.

Dr. A. E. Mark—Medical Clinic.

Dr. L. W. Barry—Obstetric Clinic.

Dr. W. S. Fullerton—X-ray Demonstration.

#### Miller Hospital

Drs. Rogers and Zimmerman, Room 1—Surgical Clinic.

Dr. A. R. Hall—Medical Clinic.

Drs. Cook and Freeman—Urological Clinic.

Dr. F. E. Burch, Room 3—Eye Clinic.

Dr. Arthur Sweeney—Nervous and Mental Clinic.

Dr. O. B. Chandler—Plate and Radiographic Demonstrations.

Dr. M. Warwick and Assistants, Laboratory—Laboratory Demonstrations, Frozen Sections, etc.

#### Mounds Park Sanitarium

Dr. Chas. Ball—Neurology and Psychiatry.

Dr. L. G. Dack—Nose and Throat Clinic.

Dr. E. Ostergren—Surgical Clinic.

Dr. A. E. Corniea, X-ray Room—X-ray Clinic.

Dr. G. Kvitrud and Assistants—Routine Wassermann and General Laboratory Technic.

Dr. C. E. Riggs—Nervous and Mental Clinic.

#### St. Johns Hospital

Drs. Gillette, Chatterton and Von Der Weyer, Room 2—Orthopedic Clinic.

Dr. H. J. Rothschild, Room 1—Common Diseases of the Eye.

#### St. Josephs Hospital

Drs. Schwyzer, Geist and Norris, Room 1—Surgical Clinic.

Dr. Comstock and Staff, Room 3—Surgical Clinic.

Dr. G. A. Geist, Room 2—Gyneological Clinic.

Dr. John Armstrong, Room 4—Skin Clinic.

Dr. H. E. Hunt, Room 5—Nose and Throat Clinic.

Dr. Wm. Davis, Nurses Lecture Room—Medical Clinic.

#### St. Lukes Hospital

Drs. MacLaren, Ritchie and Daugherty, Room 1—Surgical Clinic, Pathological and X-ray demonstration.

#### St. Pauls Hospital

Dr. F. J. Mitchell—Eye, Ear, Nose and Throat Clinic.

#### State Hospital for Crippled Children

Dr. H. E. Binger—Tonsil Clinic.

Dr. E. M. Hammes—Neurological Clinic.

THURSDAY, 2 to 5 P. M.

#### Bethesda Hospital

Dr. Chas. Ball, Chapel—Neurological Clinic.

#### City and County Hospital

Dr. Wm. Lerche, Room 1—Surgery of the Esophagus.

Dr. G. B. Kramer, Morgue—Autopsies.

#### Miller Hospital

Dr. C. E. Connor, Room 1—Otological Clinic.

Dr. J. T. Christison, Room 2—Pediatric Clinic.

Dr. E. T. F. Richards—Medical Clinic.

Dr. E. R. Bray—Ear, Nose and Throat

Dr. O. B. Chandler, X-ray Room—X-ray Demonstrations.

Dr. M. Warwick and Assistants, Laboratory—Frozen Sections.

#### Mounds Park Sanitarium

Dr. E. M. Hammes—Nervous and Mental Clinic.

Dr. R. Burns and A. Leitch—Medical Clinic.

Dr. G. Kvitrud and Assistants—Pathological Specimens and Basal Metabolism Demonstration.

#### St. Johns Hospital

Dr. F. J. Plondke and Staff, Room 2—Surgical Clinic.

Dr. Arthur Sweeney, Room 1—Neurological Clinic



**St. Josephs Hospital**

Dr. C. W. Fogarty, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. F. C. Schuldt—X-ray Demonstration.

Dr. H. N. Klein—Genito-Urinary and Skin Clinic.

**St. Lukes Hospital**

Dr. Chas. Lyman Greene and Associates—Heart and Chest Clinic.

**St. Paul Hospital**

L. N. Garlough, B. A.—Life History and Anatomy of Parasitic Worms of the Northwest, Infecting Man, A Relation to Prophylaxis with Demonstrations.

**Free Dispensary**

Dr. L. W. Barry, Room 1—Gynecological Clinic.

Dr. T. L. Birnberg, Room 2—Pediatrics.

Drs. Fulton and Rothschild—Eye Clinic.

Dr. H. J. Molzahn—Ear, Nose and Throat Clinic.

**For Snelling Hospital**

Col. H. H. Rutherford, M. C. U. S. A.—Routine Treatment of Genito-Urinary Conditions in the Army.

**University Hospital**

Dr. Walter Ramsey—Pediatric Clinic.

FRIDAY, 9 to 12 A. M.

**Bethesda Hospital**

Dr. E. G. Sterner, Room 1—Surgical Clinic.

Dr. H. E. Binger, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. J. T. Holcomb, Room 3—Surgical Clinic.

**City and County Hospital**

Dr. H. J. Rothschild—Eye, Ear, Nose and Throat Clinic.

Dr. A. E. Comstock, Room 1—Surgical Clinic.

Dr. L. E. Daugherty, Room 2—Surgical Clinic.

Dr. M. M. Ghent, Room 3—Gynecological Clinic.

Dr. E. C. Gager—Genito-Urinary Clinic.

Dr. Walter Ramsey—Pediatric Clinic.

Dr. H. Oerting—Medical Clinic.

Dr. E. T. F. Richards—Medical Clinic.

Drs. Taylor and Geer—Tuberculosis Clinic.

Dr. W. S. Fullerton—X-ray Demonstration.

**Miller Hospital**

Dr. J. L. Rothrock, Room 1—Surgical Clinic.

Dr. Wallace Cole, Room 2—Orthopedic Clinic.

Drs. Cook and Freeman—Urological Clinic.

Dr. Geo. Senkler—Medical Clinic.

Dr. E. M. Hammes—Neurological Clinic.

Dr. Margaret Warwick—Blood Chemistry, etc.

**Mounds Park Sanitarium**

Drs. Robert and George Earl and Associates—Surgical Clinic, Radium and X-ray Treatments. Oral Infections, and Surgical After-Treatments.

Dr. G. Kvitrud and Assistants—Routine Wassermann and General Laboratory Technic.

**St. Johns Hospital**

Dr. H. E. Molzahn, Room 2—Tonsil Clinic.

Dr. T. J. Maloney—Eye, Ear, Nose and Throat Clinic.

Dr. H. N. Klein, Room 3—Cystoscopy.

**St. Josephs Hospital**

Drs. Jones and Hulsiek, Room 1—Surgical Clinic.

Drs. McNevin and Shapere, Room 2—Surgical Clinic.

Drs. W. C. Carroll and Staff, Room 3—Surgical Clinic.

Dr. Geo. Dittman, Room 4—Eye, Ear, Nose and Throat Clinic.

**St. Lukes Hospital**

Drs. Gillette and Chatterton, Room 1—Orthopedic Clinic.

Dr. John Staley, Room 2—Surgical Clinic.

**St. Paul Hospital**

Dr. A. E. Ahrens, Room 1—Surgical Clinic.

**State Hospital for Crippled Children**

Dr. E. R. Bray—Mastoid and other Operations on the Ear.

FRIDAY, 2 to 5 P. M.

**City and County Hospital**

Dr. J. F. Hammond, Room 1—Gynecological Clinic.

Dr. Paul Berrisford, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. A. G. Schulze, Delivery Room—Obstetric Clinic.

Dr. E. F. Warner, O. North Ward—Contagious Clinic.

Dr. G. B. Kramer, Morgue—Autopsies.

**Miller Hospital**

Dr. F. E. Burch, Room 1—Eye Clinic.

Dr. E. T. Herrmann, Room 2—Medical Clinic.

Dr. Chandler—X-ray Demonstrations.

Dr. Margaret Warwick—Laboratory Demonstrations.

**Mounds Park Sanitarium**

Dr. W. H. Hengstler—Nervous and Mental Clinic.

Dr. A. Leitch—Heart Clinic with Electro-Cardiography.

Dr. G. Kvitrud and Assistants—Blood Chemistry and Basal Metabolism Demonstration.

**St. Josephs Hospital**

Dr. E. Norris and J. Wimbiger, Room 1—Pathology and Laboratory Demonstration.

**St. Lukes Hospital**

Dr. H. Oerting, Room 1—Transfusion and Intravenous Medication Methods.

Dr. Edward Schons, Laboratory—X-ray Technic.

**State Hospital for Crippled Children**

Drs. Binger and Wheeler—Tonsil Clinic.

Dr. E. T. F. Richards—Medical Clinic.

Free Dispensary, 1 to 3 P. M.

Dr. O. Sohlberg, Room 1—Medical Clinic.

Dr. H. N. Klein—Skin Clinic.

Dr. E. J. Engberg—Nervous and Mental Clinic.

Wilder Charity, 1 to 3 P. M.

(Baby Welfare)

Dr. Jeanette MacLaren—Infant Feeding.

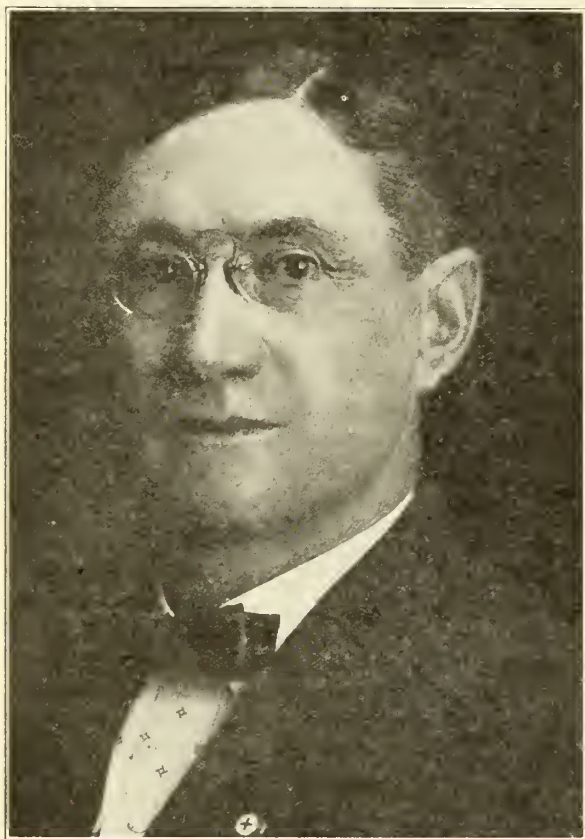
Dr. J. D. Geissinger—Diseases of Infancy.

Dr. G. K. Hagaman—Infant Feeding.

**Fort Snelling Hospital**

Col. H. H. Rutherford, M. C., U. S. A.—Routine Treatment of Genito-Urinary Conditions in the Army.

## OBITUARY



**ALFRED EUGENE SPALDING**

Spalding has left us. After struggling desperately for eight days with lobar pneumonia he succumbed to the overwhelming forces of that "natural end of man", while we who remain are bewildered by the suddenness of it all and are vainly trying to accustom ourselves to the situation.

He had lived a busy, active life. He was born in Sault Sainte Marie, Michigan, on November 24, 1851. Beginning the study of his profession in 1870, he was graduated from Jefferson Medical College in the spring of 1874, at the age of 22. He began practice in Winnebago, Illinois, the same fall, moving to Geneseo, Illinois, two years later. In the summer of 1878 he removed to Luverne, Minnesota, and there practiced for the forty-two years succeeding, working steadily until the week before his death, which occurred on Saturday, December 4, 1920. How well he spent this period is known to many, far beyond the confines of his immediate neighborhood.

Outside of his home he was primarily interested in his profession and in the activities connected with it. Early in his career he began to manifest a leaning toward surgery, and as the years went on he developed increasingly in that direction, becoming con-

stantly more widely known and more efficient. Like his tastes, his tendency in surgery was toward a simple, conservative technique, and his results were correspondingly good. He was a great believer in the usefulness of the medical society, both from the viewpoint of the broadening influence of personal contact with one's fellow practitioners, and the opportunity for interchange of ideas. Especially will the Southwestern Minnesota Medical Society and the Sioux Valley Medical Association miss him sorely from their counsels, for in both of these, made up as they were of his professional neighbors, he took deep interest, and seldom missed attending a meeting. His own contributions to the programs were models of terseness and replete with original ideas. He was never guilty of inflicting long academic theses on his audiences, but generally chose to present the resume of a clinical case, often with a specimen. Never being prolix, his efforts were always welcomed and listened to with attention. At the banquets he invariably could be counted upon for a good story, an original poem or a song, and into these occasions he entered with great zest, for these were his moments of relaxation when the seamy side of his profession could be, for the nonce, laid aside. He liked music, baseball and his medical society affiliations, and who shall say that he did not live longer and keep younger for cultivating these tastes?

He married Miss Lucy A. Thomas of Geneseo, Illinois, on December 24, 1874. Mrs. Spalding died in January, 1908. In February, 1909, Dr. Spalding married Miss Alma Orth of Lidgerwood, North Dakota, who survives him, as do also two daughters, Mrs. Ira Curtis of Mason City, Iowa, and Mrs. Gerald Connell of Thief River Falls, North Dakota.

The services at his burial were characteristic of his life. Professional friends gathered from far and near, just as though to a medical meeting, and mingled with the throng of neighbors and friends who had assembled in the Presbyterian church within a stone's throw of his home in Luverne. There was little outward manifestation of grief, for the "sadness of farewell" was overshadowed by the feeling of profound thankfulness for a noble life well spent, in the heart of everyone present.

Before the conclusion of the service Dr. McDavitt of St. Paul, old comrade and fellow-worker in the State Medical Society for years, stood beside the still form and told in brief words of his friend's life and influence, the crowning effort of a beautiful occasion and a masterpiece of spontaneous rhetoric. It was a fitting valedictory for one who stood as Spalding did in his community and in his profession, whose attainments and achievements had woven his life into the very fabric of the place in which he had striven so long and as we left him in his last resting place overlooking the scene of his labors, the irresistible thought came to me that no chance circumstances



like the termination of bodily activities could stop the impetus of spiritual momentum resulting from the life-long work of such a man. If this be true, then the life of our dear friend and colleague shall have been doubly fruitful, and his influence will have survived long after the dissolution of his earthly body.

G. G. COTTAM.

## CORRESPONDENCE

### -Some Indian Medicinal Receipts

Kayenta, Ariz.

Oct. 8, 1920.

Minnesota Medicine,

St. Paul, Minn.

While doing research work among the Bois Fort Indians of Minnesota while I was Indian Agent at Nett Lake in that state one of the medicine men allowed me to copy his medicinal receipts. Believing that, while they are not very scientific they will be of interest to the medical profession, I give them below:

1. "Receipts for medicine for pain in the stomach, also for fainting and trembling in fits. Also if very sick or a bad sore apply this medicine externally. Also for cuts, say of an ax, put this preparation on.

"Make a tea of all the different roots and barks mentioned below by boiling or steeping same: swamp spruce, the pussy willow, norway pine, white pine, kinnikinnik, and oak. To this add a little sugar to sweeten it.

2. "The following medicine is to be given for 'internal blood diseases:'

"Boil the bark of the following trees and shrubs: white poplar, yellow poplar, white birch, yellow birch, large oak, small oak, small kinnikinnik, large kinnikinnik, and all of the trees south of you. This drink.

3. "For gonnorrhea make a tea of the root-bark of the following trees, ash, oak, white elm, and sugar maple. Then add a little tobacco. Then set the solution just east and quite close to some trees. When cool, drink a cupful three times a day.

4. "For a 'bad-sick' stomach or bowels caused by eating too much or for constipation drink medicine tea of horsetails and horsemint boiled together.

5. "For stomach trouble drink a cupful of tea, prepared by boiling native peppermint, a rushpepper plant, Minnesota fern and the roots of the crow berry, and slippery (common red) elm together.

6. "Another remedy for fainting and fits, also used as a blood medicine, is sarsaparilla tea made from the leaves of that plant. This drink." (My informant advised me that this remedy is called "Eastern Medicine!" as it is the medicine of the Wabeno (Eastern) Society of his people.

7. "Another general remedy: Take the roots of the swamp tea plant, kinnikinnik, white poplar, and balmagiled poplar and pound them to a pulp. This

stew into a strong tea. This tea apply to the afflicted parts by placing cloths on same and pouring the tea on the cloths so as to thoroughly saturate them. The pounded roots and bark when hot just from the steeping tray are also applied. This remedy is much used for rheumatism and kindred diseases.

8. "For a cut foot apply tea made from boiling together roots of the rose bush, bitterroot, and elm. A little of this tea is also taken inwardly for bleeding."

ALBERT B. REAGAN.

## NEW AND NON-OFFICIAL REMEDIES

During October and November the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies.

The Seydel Manufacturing Co.

Betanaphthol Benzoate.

Benzyl Alcohol.

Mercury (Mercuric) Benzoate.

The Abbott Laboratories:

Acriflavine and Proflavine.

L. A. Van Dyk:

Benzyl Benzoate.

Benzyl Benzoate 20 per cent.

Benzyl Benzoate 20 per cent Aromatic.

The Heyden Chemical Co.:

Vargol.

Intra Products Co.:

Benzyl Alcohol.

Ven Sterile Solution Benzyl Alcohol.

**Ichthynat.**—An aqueous solution, the important medicinal constituents of which are ammonium compounds containing sulphur in the form of sulphonates, sulphones and sulphides. These characteristic forms of sulphur result from the sulphonation of the tar-like distillate obtained from certain bituminous shales. For the actions and uses of ichthynat see the general article on Sulpho-ichthyolate Preparations and Substitutes, New and Non-official Remedies, 1920, page 318. The Heyden Chemical Works, New York City (Jour. A. M. A., Oct. 2, 1920, page 939).

**Proganol.**—A compound of silver and albumose, containing not less than 8.3 per cent of silver in organic combination. For the actions and uses of proganol, see general article on silver preparations, New and Non-official Remedies, 1920, page 306. From 0.25 to 1 per cent solutions are used in acute gonorrhea, and 5 to 10 per cent instillations in chronic cases. In cystitis and urethritis from 1:1,000 to 1:2,000 solutions are used as irrigations. Used also in forms of bougies and tampons (5 to 10 per cent).

**Twenty per cent Aromatized Suspension made from Benzyl Benzoate Van Dyk and Co.**—A mixture, each 100 Cc. containing benzyl benzoate for thera-

peutic use (Van Dyk and Co.), 20.32 Gm.; acacia, 8.0 Gm.; olive oil, 5.00 Gm.; sugar, 12.00 Gm.; flavors and water, to make 100 Cc. For actions and uses of benzyl benzoate, see New and Non-official Remedies, 1920, page 49. United Synthetic Chemical Corporation, New York (Jour. A. M. A., Oct. 16, 1920, page 1069).

**Acriflavine-Abbott.**—A brand of acriflavine (see New and Non-official Remedies, 1920, page 20) complying with the N. N. R. standards. The Abbott Laboratories, Chicago.

**Proflavine Abbott.**—A brand of proflavine (see New and Non-official Remedies, 1920, page 21) complying with the N. N. R. standards. The Abbott Laboratories, Chicago.

**Betanaphthol Benzoate-Seydel.**—A brand of betanaphthyl benzoate (see New and Non-official Remedies, 1920, page 189) complying with the N. N. R. standards. Seydel Manufacturing Co., Jersey City, N. J.

**Benzyl Alcohol-Seydel.**—A brand of benzyl alcohol (see New and Non-official Remedies, 1920, page 27) complying with the N. N. R. standards. Seydel Manufacturing Co., Jersey City, N. J. (Jour. A. M. A., Oct. 30, 1920, page 1205).

**Benzyl Benzoate.—Van Dyk.**—A brand of benzyl benzoate (See New and Non-official Remedies, 1920, p. 49) complying with the N. N. R. standards. L. A. Van Dyk, New York, N. Y.

**Benzyl Benzoate-Van Dyk 20 per cent.**—Each 100 Cc. contains benzyl benzoate-Van Dyk 20 Cc., and alcohol 80 Cc.

**Benzyl Benzoate-Van Dyk 20 per cent Aromatic.**—Each 100 Cc. contains benzyl benzoate-Van Dyk, 20 Cc.; oil of orange, 0.74 Cc., and alcohol, 79.26 Cc.

**Benzyl Alcohol-Ipco.**—A brand of benzyl alcohol (See New and Non-official Remedies 1920, 27), complying with the N. N. R. standards. Intra Products Co., Denver, Colo.

**Ven Sterile Solution Benzyl Alcohol 4 per cent 2 Cc.**—Each ampoule contains benzyl alcohol-Ipco 4 per cent in physiological solution of sodium chloride, Cc. Intra Products Co., Denver, Colo.

**Vargol.**—A compound of silver and a derived albumin containing not less than 20 per cent of silver. For the action and uses of Vargol, see general article on Silver Preparations under Silver Protein Preparations. Argyrol Type, New and Non-official Remedies, 1920, p. 310. Heyden Chemical Co., New York, N. Y. (Jour. A. M. A., Nov. 27, 1920, p. 1499).

#### PROPAGANDA FOR REFORM

**More Misbranded Venereal Nostrums.**—The following preparations have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act, on the ground that the therapeutic claims made for them were false and fraudulent: Injection Malydor (The Williams Mfg. Co., Cleveland, Ohio); G Zit (The Stearns Hollinshead Co., Inc., Portland, Oregon); G Zit Aniseptics (The Stearns Hollinshead Co., Portland, Oregon);

Hinkle Capsules (Hinkle Capsule Co., Mayfield, Ky.); Tisit-Pearls (S. Pfeiffer Mfg. Co., East St. Louis, Ill.); Tisit (S. Pfeiffer Mfg. Co., East St. Louis, Ill.); Black-Caps (Safety Remedy Co., Canton, Ohio); Hexagon (Montebello Laboratories, Kansas City); Hyatt's A. B. Balsam C. N. Crittendon Co., New York City); DuQuoin's Compound Santal Pearls (Wm. R. Warner and Co., Inc., New York City); Injection Zip (The Baker-Levy Chemical Co.); Three Days Cure ("3 Days" Cure Co.); Redsules (H. Planten and Son); Blakes Capsules (Henry K. Wampole and Co.); Salubrin (Salubrin Laboratories, Grand Crossing, Chicago); Dolomol-Calomel<sup>®</sup> and Dolomol Iodoform (Pulvola Chemical Co., Jersey City, N. J.); Influenza Special Senoret (Senoret Chemical Co., St. Louis); Gray's Ointment (Dr. W. F. Gray and Co., Nashville, Tenn.); Vegetable Blood Purifier (Gibson-Howell Co., Jersey City, N. J.); Renovine (Van Vleet-Mansfield Drug Co., Memphis, Tenn.); Cin-Ko-Na and Iron (DeLacy Chemical Co., St. Louis); Craig Healing Spring Mineral Water (Craig Healing Springs Hotel, New Castle, Va.); Laxa-Cura Water (Lava-Cura Water Co.); Reuter's Little Pills for the Liver (Barclay and Co., New York); Musser's Capsules (Musser-Reese Chemical Co.); Dr. Sanger's Capsules (Edward J. Moore Sons, Inc.); Rid-It Caps (S. Pfeiffer Mfg. Co.); Black and White Capsules (Wilson Drug Co.); Benetol (Benetol Co.), consisting essentially (in agreement with a previously reported analysis by the A. M. A. Chemical Laboratory) of alphanaphthol, soap, glycerin, water and traces of essential oils and alcohol; G-U-C Capsules (Hollander-Koshland Co.); Merz Santal Compound (Merz Capsule Co.); Enoob Antiseptic Injection and Capsules (Tropical Cooperative Co.) and White Swan Injection (Stacy Chemical Co.); Dr. Clifton's Brazilian Herbs (Clifton Drug Co.); Her-Vo (Her-Vo Mfg. Co.); Acetylo-Salicylic Acid Tablets (James and Annis), containing acetanilid but no acetylsalicylic acid; Stearns' Santolods (Frederick Stearns and Co.); Milks' Emulsion (Milks Emulsion Co.); Bliss Native Herbs (Alonzo O. Bliss); Madame Dean Antiseptic Vaginal Suppositories (Martin Rudy) and Halz Tablets Ed. Price Chemical Co.); D. D. D. Ordinary and D. D. D. Extra Strong (D. D. D. Co.); Compound Extract of Cubebs with Copaiba (The Tarrant Co.); Santal Midy Capsules (E. Fougere and Co.).

**The Bethlehem Laboratories Explain.**—The president of the General Laboratories, who is also vice president of the Bethlehem Laboratories, explains that the Bethlehem Laboratories is the sales and distribution organization for hyclorite, which is manufactured by the General Laboratories, and that the offer from the Bethlehem Laboratories to sell to physicians shares in the company was the unauthorized act of an authorized agent. The General Laboratories and the Bethlehem Laboratories recognize the impropriety of soliciting physicians to purchase stock in their concern (Jour. A. M. A., Oct. 9, 1920, page 1016).



**Succus Cineraria Maritima.**—The medical profession is at present receiving through the mail circulars extolling this nostrum for its alleged virtue in "absorbing" various forms of cataract. In February, 1917, the Bureau of Chemistry of the U. S. Department of Agriculture issued a Notice of Judgment which showed that the government authorities had prosecuted the firm which markets the preparation—The Walker Pharmacal Company—because claims were made on the trade package to the effect that this nostrum was a remedy for cataract and other opacities of the eye. The authorities charged that these claims were false and fraudulent. To this charge the company pleaded guilty, but these claims are still being made through other avenues to the medical profession (Jour. A. M. A., Oct. 9, 1920, page 1007).

**The Use of Arsphenamine and Related Compounds.**—Many therapeutic perplexities remain after nearly a decade of trial of the type of compound which Ehrlich introduced. It is well for the practitioner to realize this, especially when expert workers still make an appeal for conservative interpretation. Arsphenamine has apparently made it possible or even probable, but only to the inexperienced has the cure of syphilis been made absolute and inevitable. Even the composition of arsphenamine and neoarsphenamine is not fully known, and the control of the products by the government is important. It should be borne in mind also that neoarsphenamine behaves differently in the animal organisms from arsphenamine, and should not be regarded simply as arsphenamine in a convenient form for administration. The various brands of arsphenamine and neoarsphenamine made in the United States compare favorably as to toxicity with those made abroad (Jour. A. M. A., Oct. 9, 1920, page 1005).

**Bran-O-Lax Tablets.**—The public is urged to purchase these "Lavative Wheat-Bran Tablets for constipation and indigestion instead of those severe and harmful drugs". The essential claims, either inferred or expressed, are to the effect that Bran-O-Lax Tablets are wheat bran in condensed form and that they are free from "harmful drugs". It is also claimed that "Bran-O-Lax contains one heaping tablespoonful of plain nutritious wheat bran condensed into tablet form". The A. M. A. Chemical Laboratory reports that Bran-O-Lax Tablets contain wheat bran, reducing sugar (probably glucose) in large amounts, a gummy substance, probably acacia, and about one grain of phenolphthalein per tablet. Whereas a heaping tablespoonful of wheat bran was found to weigh about 166 grains, the total weight of a Bran-O-Lax Tablet was only about 35½ grains (Jour. A. M. A., Oct. 16, 1920, page 1083).

**Toxicity of Arsphenamine.**—Roth has determined that if an alkalized solution of arsphenamine or a solution of neoarsphenamine is shaken in the presence of air for one minute, the toxicity is increased. He points out that arsphenamine preparations which

are soluble with difficulty are likely to be shaken to aid in the solution of the drug with the risk that chemical reaction may occur (Jour. A. M. A., Oct. 16, 1920, page 1072).

**Chaulmoogra Oil In Leprosy.**—Continued trials made at the leprosy investigation station of the U. S. Public Health Service and the Kalihi Hospital at Hawaii seem to justify more than ever the statement that chaulmoogra oil contains one or more agents that exert a marked therapeutic action in many cases of leprosy. The intramuscular injection of the soluble ethyl esters of the fatty acids from chaulmoogra oil usually leads to a rapid improvement in the clinical symptoms of leprosy. The ethyl esters of iodine addition compounds of the unsaturated fatty acids in chaulmoogra oil have also been used. There is no experimental proof that this addition of iodine causes any increase in the effectiveness of the material used (Jour. A. M. A., Oct. 16, 1920, page 1071).

**Fake Orange Beverages.**—The Orange and other citrus fruits possess value other than that which can be measured by flavor or fuel value. They are relied on as antiscorbutic by a large number of persons in the preparation of food mixtures which for some reason are deficient in this protective element. Oranges merit additional favor because they are relatively rich in the water-soluble vitamin B, sometimes designated antineuritic vitamin, which promotes well-being in as yet an undetermined way. In view of these facts, the chemists of the U. S. Public Health Service have done well in their timely warning against the "fake" orange beverages that have come to their attention. They report that in most cases the fraudulent products consisted of carbonated water, flavored with a little oil from the peel of the orange and artificially colored to imitate orange juice (Jour. A. M. A., Oct. 16, 1920, page 1073).

**Vaccines In Toxic Conditions.**—Under this title an article purporting to be a scientific contribution appears in the original department of the Illinois Medical Journal. The apparent purpose of the article is to overcome any hesitancy on the part of practitioners to use vaccines in toxic infectious conditions for fear that they might thereby cause harm. The theory propounded is contrary to those who have studied the subject. The man who writes the article, G. H. Sherman, is in the business of making and selling vaccines, though this is not made evident in the article (Jour. A. M. A., Oct. 23, 1920, page 1140).

**Vaccines For Common Colds.**—There is no scientific evidence that common colds can be prevented by the use of vaccines, despite the glowing recommendations of vaccine makers and the patter of the detail man. Colds characterized by catarrhal inflammation of the mucous membranes of the nose and the throat are caused by various organisms. The organism concerned in one epidemic is different from that in another. It is impossible to anticipate what organism is about to invade the household or community. In-

oculation of mixed vaccines fails to product immunity (Jour. A. M. A., Nov. 13, 1920, p. 1361).

**Chlorlyptus Not Accepted For N. N. R.**—Chlorlyptus (Weeks Chemical Co.) is a chlorinated eucalyptus oil containing 30 per cent of chlorine in relatively stable combination. It is claimed to be a new "chlorinated antiseptic", highly efficient as a wound antiseptic. It is proposed for use in local infections, burns and as an antiseptic in the alimentary and urinary tract. The laboratory investigation made in the A. M. A. Chemical Laboratory and by the referee of the Council on Pharmacy and Chemistry who was in charge of the product showed that Chlorlytus is a feeble antiseptic, considerably weaker than eucalyptus oil.

**Iron, Arsenic and Phosphorus Compound.**—The Council on Pharmacy and Chemistry reports that Hypodermic Solution No. 13 Iron, Arsenic and Phosphorus Compound (Burdick-Abel Laboratory) was found unacceptable for New and Non-official Remedies for the following reasons: 1. It does not contain ferrous citrate as claimed; instead, the iron is in the ferric condition, apparently in the form of the unofficial and unstandardized "iron citrate green" for which there is no evidence of superiority over the official iron and ammonium citrate. 2. Its name gives no information on the form in which the iron, the arsenic or the phosphorus occurs therein. The term "arsenic" does not indicate that the preparation contains the mild cacodylate. Nor does the term "phosphorus" tell that it contains the practically inert sodium glycerophosphate. 3. The preparation is unscientific because (a) it is irrational to prescribe iron and arsenic in fixed proportions; (b) there is no evidence that the hypodermic or intramuscular administration of iron has any advantage over its oral administration, and (c) glycerophosphates have not been shown to have properties other than inorganic phosphates, and hence the administration of sodium glycerophosphate as a hematinic is illogical (Jour. A. M. A., Nov. 13, 1920, p. 1358).

**Parathesin Not Admitted To N. N. R.**—The Council on Pharmacy and Chemistry reports that the local anesthetic ethyl paraminobenzoate was first introduced as "Anesthesin" or "Anaesthesin"; that the product is not patented in the United States, and that it may be manufactured by any firm which chooses to do so. In order that a common name for the drug might be available, the Council coined the short, easily remembered and descriptive name "Benzocaine". As the term "Anesthesin" had become a common name for the drug, the Council also recognized this as a synonym for benzocaine. While the Council had previously recognized the brand of benzocaine manufactured by the H. A. Metz Laboratories, Inc., under the name "Anesthesin", this firm requested recognition of the product as "Parathesin". As the use of one substance under several names causes confusion and retards rational therapeutics, the Council's rules provide against the recognition of proprietary

names for nonproprietary, established drugs. For this reason, and because the legitimate interests of the manufacturer may be safeguarded by appending his name or initials to the common name, benzocaine or anesthesin, the Council refused recognition to the designation "Parathesin" (Jour. A. M. A., Nov. 13, 1920, p. 1358).

## OF GENERAL INTEREST

Dr. Brelsford of Denver, Colo., will be the medical director at Sunnyrest Sanitarium.

Dr. F. E. Best, who has been in the service, will return to Wells about January 1st.

The Minnesota State Sanitary Conference held a meeting in St. Paul, November 17th.

Dr. F. L. Durgan of Winnebago will be the residence physician at the Nopeming Sanitarium.

Dr. J. B. Stevens of Sioux Falls will locate in Luverne and will become associated with Dr. C. L. Sherman.

Dr. C. W. Kanne has moved from Arlington to Faribault where he will specialize in obstetrics and gynecology.

Dr. C. H. Cherry of the Rood hospital staff of Chisholm will move to Minneapolis and associate himself with Dr. Mathews.

The November meeting of the Minnesota Academy of Ophthalmology and Oto-laryngology was held in Rochester, November 15.

Sister Irene Anderson, R. N., of Bethesda hospital, St. Paul, is taking a post graduate course at the Lankenau hospital, Philadelphia.

Dr. George Douglas Brand announces the opening of his offices at 535 Lowry Building, St. Paul, for the practice of medicine and surgery.

Dr. H. W. Orr, of Lincoln, Neb., delivered a Mayo Foundation lecture in Rochester, Thursday, December 2, on "The Treatment of Spinal Injuries."

Dr. Wilford Nelson, who has been an interne in a Harvard, Mass., hospital will locate in Fergus Falls and will be associated with Dr. J. A. Freeborn.

The physicians and dentists of Minneapolis will erect a building of twelve stories. A corner lot at 12th street and Mary place has been purchased.

The thirty-sixth annual meeting of the Southwestern Minnesota Medical Society was held in Pipestone November 11th. The May meeting will be held in Fulda.

At the Centennial Celebration of the University of Cincinnati the honorary degree of Doctor of Science was conferred on Dr. Edward C. Rosenow of Rochester.

Dr. C. M. Jackson, Professor of Anatomy, University of Minnesota, delivered one of a series of Mayo Foundation Lectures on the History of Medicine, December 16 on "History of Anatomy."

Dr. F. F. Callahan, resident superintendent at Pokagama Sanatorium, addressed the American Sana-



torium Association at its midwinter meeting at Rochester, N. L., on the early diagnosis of tuberculosis.

The Pokegama Fellowship in Tuberculosis has been established at the Pokegama Sanatorium for University of Minnesota graduates. This fellowship is included in the graduate school and carries with it a yearly stipend of one thousand dollars.

The Sivertsen Clinic has been organized with offices at Twenty-fourth avenue South and Sixth Street, Minneapolis. The members of the clinic are Drs. Ivar Sivertsen, F. J. Souba, M. Sundt, A. Sivertsen, R. C. Logefeil, R. I. Dorge and G. M. Lishernes.

Dr. Norman M. Keith, former Clinician in Medicine in the Faculty of Medicine of the University of Toronto, has gone to Rochester, Minn., to be associated with Dr. Rowntree and Dr. Fitz in further development of research in internal medicine and in the hospital care of patients with medical conditions.

In a recent bulletin the U. S. Department of Agriculture states that assure killing trichinae in pork the meat should be boiled fifteen minutes (summer) to eighteen minutes (winter) for each pound of weight. If the meat is put into cold water deduct half the time required to bring the water to a boil.

Civil service examinations are scheduled to be held at the various civil service centers throughout the state. On January 19th and March 9th, 1921, examinations will be held for physicians for the Panama Canal Service; on March 1, 1921, for Saint Elizabeth's Hospital internship. Those interested may obtain the details from any of the civil service officers scattered throughout the state.

Late in October a meeting of the general staff of the Mayo Clinic was held in honor of Sir Berkley Moynihan and Sir William Taylor who returned with Dr. W. J. Mayo to the Clinic from the meeting of the American College of Surgeons. Sir William Taylor, ex-president of the Royal College of Surgeons of Ireland, gave a short talk on the history of that organization which was established in 1774 by Royal Charter. Sir Berkley Moynihan outlined the John B. Murphy Oration on Surgery delivered by him at the meeting of the American College of Surgeons.

St. Louis University, the oldest seat of learning west of the Mississippi river, has for the first time in its more than a century of endeavor made a public appeal for funds, the larger portion of which are to be applied to the support of the Colleges of Medicine and Dentistry. The university has asked its alumni and friends to raise the sum of \$3,000,000 as a Centennial Endowment Fund, in commemoration of the 100th anniversary of the founding of the institution. The anniversary occurred in 1918, but because of war conditions existing at that time, with over 3,000 of the undergraduates and alumni of the university having answered the call to arms, the celebration was postponed until conditions were more nearly normal.

Of the \$3,000,000 asked, the income on \$1,500,000 is for salaries of the teaching staffs of the two colleges;

the cost of a new laboratory for the school of medicine is estimated at \$250,000; new buildings and clinics for the Schools of Medicine and Dentistry will cost an additional \$550,000. The remainder of the \$3,000,000 will be applied to the needs of the Institute of Law, School of Commerce and Finance, and the College of Arts and Sciences. It is hoped by the Faculty that old graduates of the Medical and Dental Colleges of the University, who are now scattered all over the world, will appoint themselves a committee of one to aid their Alma Mater to realize the Centennial Fund.

The State Board of Health, in cooperation with the city health department of Virginia, has opened a free clinic for venereal disease. This clinic is held in the Virginia City hospital and is open at 8 o'clock on Mondays for men and at the same hour on Thursdays for women. The physicians in charge at this clinic are Dr. W. M. Empie and Dr. H. T. Ground. All physicians on the range are invited to send to this clinic persons applying for treatment for venereal disease, who are unable to pay a physician's fee. This makes the fifth of the group of free clinics operated by the State Board of Health jointly with local agencies. The others are located in Minneapolis, St. Paul and Duluth.

The American College of Surgeons elected the following Minnesota surgeons, candidates for fellowship at their eighth annual meeting at Montreal in October: Drs. A. E. Booth, Minneapolis; Paul Brown, Minneapolis; J. L. Butsch, Rochester; C. M. Carlaw, Minneapolis; W. C. Carroll, St. Paul; T. L. Chapman, Duluth; C. C. Chatterton, St. Paul; H. S. Clark, Minneapolis; C. D. Conkey, Duluth; J. A. Evert, Brainerd; E. K. Green, Minneapolis; S. W. Harrington, Rochester; H. Holte, Crookston; E. M. Jones, St. Paul; C. L. Larsen, St. Paul; V. N. Leonard, Duluth; A. L. Lockwood, Rochester; C. E. Lum, Minneapolis; C. O. Maland, Minneapolis; F. E. McEvoy, Rochester; F. A. Olson, Minneapolis; O. W. Parker, Ely; S. C. Schmitt, Minneapolis; F. C. Schuldt, St. Paul; F. J. Souba, Minneapolis, and J. C. Staley, St. Paul.

Dr. Stokes, of the Mayo Clinic recently attended the joint meeting of the Chicago Dermatological and St. Louis Dermatological Societies in St. Louis. He read a paper, "The problem of syphilis in general diagnosis," before the Southwestern Medical Society in Wichita, Kansas. From Kansas he went to New York City and spent two days in studying the Bertillon system of anthropometric measurements to be applied in a study of heredito-syphilis. Dr. Stokes later went to Washington, D. C. to deliver a series of seven lectures before the Institute of Venereal Disease Control and Social Hygiene, which was held by the United States Public Health Service during the first week in December. This institute is a ten-day free course for all physicians, chiefs of clinics, and others interested in the management of syphilis and gonorrhoea. The medical faculty includes Dr. Fordyce and Dr. Keys of New York City, Dr. Hugh

Young of Baltimore, Dr. Irvine of Minneapolis and other specialists. Following the Institute, a conference on the social aspect of venereal disease will be held in Washington which will include representatives from Europe and South American countries; at this time an effort will be made to formulate a policy with reference to venereal disease and social hygiene.

On Wednesday, December 8th, about fifty former medical officers gathered together in St. Paul to renew old acquaintances and swap stories of their experiences during their service in the late war. At this meeting it was decided to have a general reunion of all the former medical officers of the Northwest, in St. Paul on the evening of Jan. 11th, 1921 during Clinic Week. The following committee was appointed: Dr. T. J. Maloney, Chairman; Dr. F. J. Savage, Sec.; Dr. Charles Freeman, Dr. Knox Bacon. This committee were directed to send out announcements and to look after the details of the coming good time. It was further decided that this should be an informal affair giving everyone the opportunity of meeting the fellows he wants to see and to talk over the times that were times. It was further thought possible that a Medical Officers Society of the Northwest might be formed at this time. The committee looking for cooperation consulted Lt. Col. Rutherford, Surgeon at Fort Snelling and received a pleasant surprise. Col. Rutherford has invited all the Medical Officers to the Fort on Tuesday evening Jan. 11th, 1921 to participate in a real old army mess and get-together. From his description there will be nothing left out. The committee is indebted to Col. Bjornsted and Lt. Col. Rutherford, for throwing the Post wide open to the Medical Officers and we can now all be assured that a real get-together of real fellows under real conditions will take place on Jan. 11th, 1921.

## NEWS OF THE HOSPITALS

Mrs. B. Morris, formerly superintendent of Mounds Park Sanitarium, was recently married to Dr. M. M. Ghent, a well known St. Paul physician and a member of the hospital staff. Since the sanitarium took over the Cobb and Midway hospitals, the former institution has been renovated throughout and will accommodate only women patients. Midway will continue to operate as a general hospital under the direction of Miss A. Friedsburg.

Dr. F. J. Mitchell of the St. Paul hospital has been in the east for the past two months. Recently the hospital installed the Scanlan-Morris high pressure sterilizers.

Eighteen members of the probation class gave a highly satisfying demonstration the first part of December to the staff of St. Luke's hospital. Miss Wunch, a graduate of John Hopkins has been placed in charge of the obstetrical department. Additional

facilities for administering x-ray treatment have been installed by Dr. Schons, roentgenologist of the staff. Mrs. J. B. Hoxis former president of the hospital was a visitor recently from California. Alexander Cathcart is now president. Henceforth St. Luke's will be known as the hospital of Protestant churches, the articles of incorporation having been changed. Each denomination will have representation on the board. The institution was formerly under Episcopal jurisdiction.

Under the supervision of William Mills, superintendent, the dormitory of the Swedish hospital has been remodeled. Twenty-four new beds will be added. Radium service has been inaugurated; and the maternity department has been enlarged to accommodate thirty patients. Mr. Olson, former superintendent is now in charge of the P. & H. S. of M.

Sister Lena Nelson, former superintendent of the Norwegian Lutheran Hospital has been succeeded by Sister Marie Follvard, who has brought about the remodeling of the Pathological and x-ray departments.

St. Barnabas hospital has been highly commended for its treatment of soldier patients. At present there are from fifty to sixty at the hospital. They occupy the annex and enjoy the recreative and vocational facilities that the institution has provided. Dr. Kano Ikeda, who has charge of the Pathological and x-ray departments will conduct the metabolic laboratory that has been added.

The old delivery room of the Hillcrest hospital has been remodeled into a nursery, since a new delivery room has been prepared.

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## PROGRESS

Abstracts to be submitted to Section Supervisors.

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### MEDICINE

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#### SUPERVISORS:

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FIDELITY BLDG., DULUTH.

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LA SALLE BLDG., MINNEAPOLIS

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**INTESTINAL TUBERCULOSIS:** Robert C. Pater-son (Amer. Rev. of Tub., Aug., 1920). In the past intestinal tuberculosis has been considered a well nigh hopeless complication of pulmonary tuberculosis. We are now beginning to detect this complication in its earliest stage in many cases before symptoms are present and others with only slight digestive disturbances complained of.

Routine X-ray studies of the intestinal tract of all cases of pulmonary tuberculosis is chiefly responsible for the early diagnosis of tuberculous ileo-colitis. The lesions are chiefly ulceration and a certain amount of fibrosis or inflammatory thickening around the ulcer. The mode of infection is probably hematogenous.

The author reviews the symptoms usually asso-



ciated with intestinal tuberculosis but considers the greatest help to be an X-ray examination after a barium meal. The most characteristic finding when tuberculous ulcerations are present, are (1) hypermotility of the intestines, (2) ileal stasis, and (3) filling defects. These characteristic findings are present in cases where ulceration of the caecum or ascending colon exists. No diagnostic picture of small intestine ulceration has yet been found. The course of the disease is progressive but healing, in the experience of the author, does occur in a very small number of patients.

Medical treatment is palliative at its best so the author advocates surgery for suitable cases. The surgical procedures are (1) excision of all the diseased portion (usually impracticable); (2) anastomosis of healthy bowel above site of disease into healthy bowel below with exclusion of diseased area and fistula formation to drain ulcerated bowel; (3) ileostomy above the disease; (4) simple appendectomy in cases where pain has been a prominent symptom has given marked relief.

Before operation should be resorted to the pulmonary condition should be most carefully looked into. With progressive trouble in the lungs the operation will be a danger but if the pulmonary lesion is stationary or inactive and the patient's symptoms chiefly caused by intestinal disease, operation is justifiable. In other words the prognosis depends more on the lungs than on the intestines.

The extent of the intestinal lesion can not be predicted by present methods of examination. Numerous laparotomies have demonstrated this. Hence operation should be looked upon as more or less exploratory.

At the end of this article the author gives brief reviews of 22 cases which were operated with the following results:

|                            |    |        |
|----------------------------|----|--------|
| Alive and well .....       | 6  | 27.2%  |
| Alive and improved .....   | 4  | 18.2%  |
| Alive and unimproved ..... | 4  | 18.2%  |
| Dead .....                 | 8  | 36.4%  |
|                            | 22 | 100.0% |

EVERETT K. GEER.

**SOME OBSERVATIONS ON EPILEPTICS AND ON EPILEPSY, CHIEFLY FROM A ROENTGEN RAY STANDPOINT:**. Thomas M. T. McKennan (Arch. of Neur. and Psy., Sept., 1920). The causes and nature of so-called essential epilepsy are particularly worthy of such consideration and attention that would assist in lifting them from the realms of the vague and the obscure. McKennan quotes from the work of Johnston and Henninger, and reports a study of his own on 90 cases of epilepsy. He finds bony overgrowth or bony deposits about the pituitary area in practically 58% of the cases; in 11% there were smaller pituitary areas than normally; cerebropathy in 10%; tumors or evidence of pressure in the inter-

pituitary area 10% also; calcareous degeneration in 2.5% and no changes in 8.8%. Intermittent hyperemia in the pituitary gland is held to be the cause of bony overgrowth. The author feels quite satisfied that crippling of the pituitary gland in one way or another; recurring hyperemia of the gland; a small inefficient gland; or struma or simple hypertrophy may be looked upon as the cause of essential epilepsy.

Granting the above findings it would however, still be too early to sit back complacently while contemplating on the etiology of epilepsy for how are we going to explain the recurring hyperemia, what is the more basic cause and the more primary mechanism? The very nature of the periodicity, one would surmise, suggests an influence by, or association with, other glandular functions.

J. C. MICHAEL

**EPIDEMIC ENCEPHALITIS (WITH A REVIEW OF 115 AMERICAN CASES).** Arthur D. Dunn and Francis W. Heagey (Am. Jour. Med. Sc., Oct., 1920). A brief review of the history is given. The specific etiological factor has as yet not been isolated, but as predisposing factors, 36 of the 115 cases gave a history of a previous respiratory infection within one year prior to the onset of the disease. The symptomatology of the disease is described as being most protean. The authors have endeavored to classify various forms of the disease from the clinical standpoint, but the classification is by necessity somewhat arbitrary. Some of the most common special symptoms are considered, and their frequency noted. Ocular disturbances are frequent. Of the 115 cases, there were third nerve palsies in 63, and sixth nerve palsies in 39. Diplopia was recorded in 55 cases, with ptosis in 21. The absence of fourth nerve, involvement is striking, in view of the anatomical proximity of its nucleus to that of the third nerve. The greatest importance is attached to the presence of ocular symptoms, the authors giving it priority in significance over lethargy and the atypical spinal fluid. The other cranial nerves were less frequently involved, but the seventh was next in frequency with an incidence of 15 occurrences in the 115 cases. Polypnea occurred in 3 of the total series of cases. Lethargy in varying degrees occurred in 79 cases, and was the first symptom in 34. Catalepsy and catatonia occurred in 26 cases, and headache in 54. Rigidity of the neck, if present, is not as a rule very marked. Tremor was present in 35 cases, but tremor or twitching of the abdominal muscles has not occurred as frequently as one would be led to conclude from Riley's & Bassoe's articles. Disturbance in the reflexes are extremely varying and atypical, but disturbances were noted in 31 cases. Peripheral change was noted in 26 cases. The authors believe that perspiration is a frequent symptom, but according to the literature, rather rare. Fifty of the cases were characterized by a complete absence of fever. The average maximum tempera-

ture was 102°, and except in the lethal cases never rose to a point higher than 105°.

The laboratory findings were characterized by an absence of uniform findings. The highest leukocyte count was found to be 22,000, and the average was 10,200.

The urinary examinations were inconclusive, and practically all were negative.

The cell count of the spinal fluid, although frequently normal, was found to be, nevertheless, frequently increased, and the average for 64 spinal fluid examinations of 100 collected cases in the literature was 16 cells per cubic millimeter. The globulin test was positive in over 50 per cent. Pressure was increased in only 10 per cent.

Tilney and Riley and Bassoe have given us the most information in America concerning the pathology. The chief findings are summed up as follows: (1) Meningeal edema and thickening; (2) softening and congestion of both gray and white matter of the brain and pituitary gland; (3) punctate hemorrhages into the mesencephalon and thalamus and the basal ganglia; (4) thrombosis of small vessels; (5) perivascular infiltration of small vessels; (6) edema of the mesencephalic area.

Thirty-one of the 100 cases from the American literature died. In the authors' series, 4 out of 15 died. Recovery is usually slow, and disturbances in cerebation took on the average three to four months to clear up. Facial nerve palsies lasted four or five months. The Asthenia, depression and dizziness persisted seven months on an average. The longer the course of the disease the better the chances of recovery.

There is no specific treatment. Lumbar puncture seemed to be of benefit in the majority of cases. Urotropin has been used empirically; there is very little to support its efficacy. F. J. HIRSCHBOECK.

## SURGERY

### SUPERVISORS:

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**SOME PRINCIPLES INVOLVED IN THE TREATMENT OF EMPYEMA:** Evarts A. Graham, (Surg., Gyn. and Ob., July, 1920). The recent extensive literature on empyema reveals both a striking tendency toward a more or less standardized treatment and a radical departure from methods in use prior to the war.

The author points out that the essential principles involved are: (1) The avoidance of an open pneumothorax in the acute stage during active pneumonia; (2) the early sterilization and obliteration of the cavity, and (3) the maintenance of the patient's

nutrition. He has shown by experiments on living dogs that the former prevalent conceptions of the mechanism of action of an open pneumothorax are incorrect.

In the normal thorax the mediastinal structures, instead of constituting a more or less rigid partition between the two pleural cavities, are in reality so mobile that they offer a resistance to air pressure which is equivalent to the pressure exerted by a column of water only 0.5 to 1.0 centimeters high. This resistance is, therefore, negligible, and from the standpoint of pressure relationship the thorax can be considered as one cavity instead of two. Any change of pressure in one pleural cavity will manifest itself to practically the same degree in the other pleural cavity, with the result that both lungs will be about equally compressed. The situation in this respect is the same in the dog as in man, and, therefore, experimental results obtained on the dog can be directly applied to man.

Fatal asphyxia as a result of an open pneumothorax depends upon several factors, the important of which are the size of the opening and the vital capacity of the individual.

It is possible, by a mathematical expression, to approximate in a given case the maximum non-fatal opening in the chest wall if the vital capacity is known. A person with an average vital capacity (3700 c. c.) and a normal thorax can withstand an opening in the chest wall of fifty-one square centimeters, but the person with an exceptional vital capacity (as, for example, 7100 c. c.) can live with an opening 101 square centimeters. A bilateral open pneumothorax is practically no more dangerous to life than a unilateral opening, provided that in each case the areas of the openings are the same. If the vital capacity is so low as to approximate the tidal air, even a very small opening may be fatal.

These observations have a very important bearing on the question of open drainage cases of empyema, particularly during the acute pneumatic stage when the vital capacity is low. After adhesions have formed and the mediastinum has become somewhat stabilized, both by adhesions and inflammatory induration, then the pressure relationships may be materially different on the two sides.

Effects of an open pneumothorax other than those directly upon the lungs are briefly discussed by the author, such as heat loss, changes in the systemic circulation, and danger of infection.

The value of Dakin's solution in sterilizing and obliterating empyemic cavities as well as its power to decorticate lungs, is shown. Collapsing thoracoplastic operations have the disadvantage, even when successful, of apparently permanently reducing the vital capacity. The maintenance of the patient's nutrition is most important. FRED R. SANDERSON.

**URETERO-URETERAL ANASTOMOSIS:** Reuben Peterson, (Surg., Gyn. and Ob., vol. 31, No. 2, pp. 132-142). The author reports a case of section of



the right ureter during an abdominal hysterectomy for cancer of the uterus. An anastomosis of the ureter was made by the end-to-end technique which he describes. Examination of the patient seven months later showed a good functioning ureter. In the roentgenogram the ureter appeared to be dilated to some extent throughout its entire length, and there was some dilatation of the pelvis and terminal calices. A No. 6-F. catheter was passed up both ureters without meeting obstruction. By the phenolsulphonephthalein test there was a return of 5 per cent of the dye from the right kidney and 10 per cent from the left kidney in ten minutes. Bacteriological study of urine from the right kidney did not disclose organisms. The capacity of the right renal pelvis was 16 c. c.

The author collected seventy-two cases from the literature in which uretero-ureteral anastomosis had been made by various methods. Four deaths in this series were attributable to the ureteral anastomosis, giving a primary mortality of 5.5 per cent. The author does not believe it is necessary to employ the end-to-side method of anastomosis in preference to end-in-end in order to avoid stricture at the point of anastomosis. The end-in-side anastomosis is the simplest of all methods and sacrifices but a small portion of the ureter, since it is necessary to invaginate only from one-fourth to one-third of an inch of the proximal portion of the ureter. If a large portion of the ureter is removed, the author prefers to loosen up the bladder or kidney, when an end-to-end anastomosis can be made without undue tension on the ureter. Retroperitoneal drainage is advocated. Contact of the drain with the end of anastomosis is, however, avoided. Should temporary leakage occur, covering the anastomosis with peritoneum prevents any urinary contamination of the peritoneal cavity.

In order to determine the results of uretero-ureteral anastomosis subsequent examinations of the bladder, ureter, and kidney must be made, functional tests must be performed, and the condition of the urinary tract demonstrated by x-ray examination. Without such investigation it may develop that the cured patient has an atrophic or hydronephrotic kidney with a functionless ureter, and with the opposite kidney doing double work. When the uretero-ureteral anastomosis is not followed by leakage, there is an excellent chance for a good surgical and functional result, but with leakage following, success is rare. In case of permanent leakage, nephrectomy may be indicated in preference to a second attempt to repair the ureter.

V. C. HUNT.

**INFECTIONS OF BONES AND JOINTS:** Frederic J. Cotton (*Surg. Gyn. Obs.*, Sept., 1920). The principles of treatment of bone and joint infections, which have been developed in the recent war, can with certain modifications be applied to the conditions met in civil practice.

In case of the compound fracture, the early debridement, while not as extensive as that advocated by the majority of military surgeons, aids in limiting infections and in treating secondary infections and in keeping track of the necrosed bone fragments. Generally speaking, a procedure which is both wise and beneficial is to remove no bone early when there is an infection, to insure wide open drainage, disinfect and wait for demarcation of necrosed bone. Each case must be treated to insure accurate adjustment and best contact of fragments so that repair can proceed unobstructed after sepsis is controlled. Various splints have been devised and each has its limitations. The question of union remains after sepsis has been controlled. A variety of causes of non-union exist. Briefly, the most important are: the amount of trauma, devitalized tissue both bony and muscular. Various procedures have been used from time to time. Bone grafts, use of magnesium and insoluble lime salts and certain general systemic measures, such as the use of salvarsan, thyroid extract, etc., while more or less experimental, it is hoped will aid in the cure of clean non-unions and of septic cases by depositing nutrient and stimulant materials in the gap.

In osteomyelitis of the haematogenous type, there are certain points in the pathology which influence the method of procedure. In general, these are: the possibility of lymphatic transfer from local focus of sepsis in a limb to the bone at a higher level, the variability of the amount of bone destruction in any case of osteomyelitis, the spontaneous healing of the so-called Brodie's abscess, the slow periosteal repair after formation of involucrum. In the diagnosis of this condition, any case presenting bone tenderness, with or without fever or pain, must be regarded as suspicious. The presence of a sinus leading towards a bone is a condition to be inquired into. In differential diagnosis, scurvy in children, syphilis and tuberculosis are the most prominent conditions to be ruled out.

The treatment of osteomyelitis is summed up under following heads: first—abortive treatment consisting of early drainage before bone destruction; second—trephining, drainage, disinfection and secondary removal of sequestra in cases of small amount of bone drainage; third—drainage and disinfection in case of considerable bone necrosis, with removal of sequestra when demarcation has taken place; fourth—in case of total sequestrum, sub-periosteal resection when X-ray shows regeneration of new bone; fifth—in case of large involucrum surrounding sequestra, opening of shell with removal of sequestra, leaving a trough to be treated with bone wax, Dakin irrigation, turned in flaps of skin, muscle or fat; sixth—in case of sinus formation, open trough drainage with Carrel-Dakin treatment; seventh—in late and protracted cases, trough drainage, chlorination disinfection, then bone wax filling. Those cases may

be disinfected by use of 95% carbolic and alcohol method and use of bone wax in cavity.

Infected joints may be divided into two main classes each with their own special treatment—First, the early cases in which there are no bone lesions are treated by opening wide and mobilizing to the limit from the start with or without disinfection of Dakin's solution, the Willems' method, or opening joint and irrigating with normal salt and corrosive solution 1-15000 with closure of capsule and mobilization after a few days. Second, the later cases with adhesions limiting motions are treated by forcible breaking up of adhesions under anesthesia carefully done, followed by fleeting fixation in the optimura position for the given joint, early and careful heat and massage and "active" not passive motions.

G. K. WILLIAMS.

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## GYNECOLOGY AND OBSTETRICS

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### SUPERVISORS:

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FIDELITY BLDG., DULUTH.

ALBERT G. SCHULZE,  
LOWRY BLDG., ST. PAUL.

**CERVICAL EROSIONS:** Philip J. Reel (Ann. of Surg., Vol. 71, No. 2). The author brings out several more or less generally accepted facts concerning this common and persistent condition.

1. It is not a true erosion at all but really a proliferating adenoma.

2. It is due to exposure of the columnar cervical endometrium to the acid secretion of the vagina and, to infection. The most common cause is laceration of the cervix with eversion of the cervical lips.

3. Eden and Lockyer distinguish three types.

(a) Follicular, with retention of secretion in the cervical glands, with distention and formation of "Nabothian Cysts".

(b) Papillary erosion with hypertrophy of stroma and projection.

(c) A combination of the two forms.

4. Symptoms are: vaginal discharge, menorrhagia due to associated subinvolution, and subsequent sterility.

5. Treatment—The author's best results have been obtained with: rest, alkaline douches, curettage, and amputation of the cervix in severe cases.

ARCHIBALD L. McDONALD.

**CONSIDERATIONS OF SURGICAL HAZARDS IN DIABETIC PATIENTS:** Nellis B. Foster (Ann. of Surg., Vol. 71, No. 3). This is of direct interest to gynecologists since the author states that 60 per cent of the fatalities in diabetics beyond the third decade, follow surgical operations, and that 70 per cent of these die in coma. Most of these patients

were considered as mild cases as measured by the degree of glycosuria. This is not a reliable criterion of the severity of the disease. In advanced cases changes in the kidneys occur, characterized by decrease or disappearance of glycosuria but with a high blood sugar content. Infection, acute or chronic and anesthesia, especially ether, tend to increase the blood sugar content. Infection, acute or chronic and hydrates.

As regards the carbon di oxide combining power of the blood, the author considers that this should be 40 per cent or over to offer a reasonable margin of safety. A blood sugar content of 0.35 even in the absence of acidosis is a dangerous amount for a surgical procedure. For such patients the only safety is to improve conditions previous to operation. The use of alkalis is often disappointing on account of insufficient dosage. He advises from 30 to 45 grains per hour, given in Vischy water till the Carbon di oxide is raised to a safe level.

ARCHIBALD L. McDONALD.

**OPERATIVE TREATMENT OF CANCER OF THE CERVIX UTERI:** Paul M. Forgue (Arch. Mensueles d'Obstetrique et Gyn., Oct., 1919). In an interesting general review the author discusses four phases of this question. 1. The means of securing early operative treatment. Results of operative treatment should be considered in relation to the number of cases seen and not the number operated upon. There have been few important improvements in operative methods in recent years and hope for more cures is in earlier operation. The crusade must be worked out logically and carried on with perseverance if the results are to be permanent. They find three sources of error and delay: the physician, the midwife, and the patient. As regards physicians, education and experience are demanded. In cancer and in tuberculosis, textbooks dwell on advanced signs when the patients are beyond curative therapeutics. One should suspect any type of intermenstrual bleeding, especially at the menopause, return of periods, watery bloody discharge, or fetid discharge. In all such cases one should insist on: immediate examination, the most rapid precise diagnosis, and immediate operation. Vaginal bimanual examination is of more value than that with a speculum. One should note changes in consistency, lesions of the cervical lips, infiltration of the parametrium, or invasion of the vesico-vaginal, and recto vaginal septa. Biopsy is of great value but not exempt from error. Special study is needed regarding certain "pre-cancerous lesions". In France, the midwives offer a valuable means of spreading propaganda since about 30 per cent of the author's cases were first seen by midwives. For the public, it is necessary to overcome; false modesty, ignorance, fear of hospitals, and of surgical operations; to teach the significance of menstrual irregularity, and the curability of cancer in the early stages.

2. Limits of operability have been widened as a



result of improved technical skill with the Wertheim type of operation. The mortality is still high due to: Hemorrhage, shock, septic cellulitis, involving the exposed retroperitoneal tissues, peritonitis, and embolism. Vaginal examination does not always settle the question of operability and this should not be settled without laparotomy.

3. Choice of operation and technical considerations. Intervention for radical cure must include a wide excision of the parametrium with the uterus and dissection of the ureters. The author prefers the double operation i. e. preliminary vaginal dissection of the cervix, and a wide abdominal panhysterectomy. Their present technique is based on the Wertheim. Clark and Reis. Vaginal hysterectomy is reserved for handicapped cases; obese women or those with poor resistance.

The chief aims today are to: (a) reduce mortality, (b) prevent recurrence.

(a) To reduce mortality the most important factor is infection and sepsis, since this covers the largest number of deaths, including some listed under other factors. It is most important that the raw surfaces be protected from contamination from the vagina, and cervix, or from salpingitis or pyometrial collections. The safest method is the removal of the cervix and vaginal cuff as a closed sac, either by means of special clamps, or by preliminary vaginal dissection and closure of the vaginal flaps by sutures. The author prefers the latter method since the vaginal dissection permits more free mobilization of the uterus in the abdominal part of the operation. He recommends the use of compresses clamped to the skin wound and complete isolation of the pelvis by packing. Two per cent formalin is used to disinfect the vagina. The peritoneal surfaces are carefully approximated, and the sigmoid is used to further isolate the pelvis. Vaginal drainage is commonly used.

(b) To prevent recurrence he suggests: improved technique and accurate hemostasis to permit of wide dissection of the parametrium and routine isolation of the ureters. He prefers spinal anesthesia. In general extensive induration gives a bad prognosis, but often includes much inflammatory non-malignant tissue. Excision of lymphnodes is limited to palpable masses in the pelvic wall near the bifurcation of the iliac vessels. It is not possible to remove the lymphatics'en bloc' or to compare cancer of the uterus to that of the breast.

4. Recurrences: 50 per cent occur within the first year, 25 per cent more in the second so that after three years the prognosis is good, but he still accepts the five year limit. Cancer of the fundus gives a favorable prognosis in from 75 to 80 per cent. Cylindrical cell cancer of the cervix gives more recurrences than squamous cell type, as do those in young women.

ARCHIBALD L. McDONALD.

## PEDIATRICS

### SUPERVISORS:

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**FURTHER STUDIES IN THICK CEREAL FEEDING IN MALNUTRITION IN INFANCY:** Harold R. Mixsell (Arch. of Ped., Aug., 1920). In the August number of 1920 of the Archives of Pediatrics, Dr. Mixsell reports two selected cases of thick cereal feeding for poorly nourished infants, in addition to twelve cases reported in August, 1919.

He employs a fat free milk or one averaging under one per cent in fat, as the liquid basis of the mixture, thus relieving the infant of the often poorly assimilated fat, and at the same time obtaining the high protein and salt content of the skim milk that would be lost if water were used. Farina is preferred as the cereal because of its colloidal qualities and the thickness of the mixture it produces. One tablespoon of farina to 5 or 6 ounces of skimmed milk is used; with two level tablespoonfuls of cane sugar and two level tablespoonfuls of dextri maltose to each 30 ounces of the mixture, all to be well cooked, from 30 to 60 minutes.

By thus combining several different carbohydrates, the absorption is slow and the child is enabled to utilize a large amount of sugar without danger of a sudden overdose which would tend to create a carbohydrate diarrhea. If difficulty is met with in getting the baby to take the cereal, the cane sugar may be increased to add more sweetness. Where signs of pylorospasm have appeared in these cases, the vomiting has ceased after a few weeks use of the cereal.

Two to six ounces of green vegetable puree may be added as early as the sixth month when the child has become accustomed to the farina mixture. Celery, string beans, spinach, carrots and young turnips are preferred, and supply, besides the extra calories and salts, the water soluble B vitamine which stimulates growth, and in which the cow's milk is deficient. With this cereal mixture, the baby is able to take an extremely large number of calories, in many cases over double the number required by its weight, and it will tolerate this feeding over a longer period of time than any other high caloric feeding.

The first case report is of a child 5½ months of age who failed to gain properly in spite of the use of many feeding formulae, including modified milk, skimmed milk mixtures, Dryco dry milk, Walker-Gordon milk, cereal, beef juice, and orange juice, with both high and low sugar feedings. The farina mixture was prescribed with an almost startling change for the better and a gain in weight of 23 ounces in eleven days, which settled down to an average gain of nine ounces a week, and brought

the baby up to a normal weight of 25 pounds at one year of age. From four to eight ounces of water was allowed twice a day.

The second case reported was the child of a mother 40 years of age, delivered after protracted difficult labor. It had been on a milk mixture from two months of age, and had vomited after almost every feeding. At 5½ months, the farina mixture was prescribed and the child started to gain slowly, and the vomiting gradually ceased. Although the results were not particularly encouraging in this case, the child did better on the cereal than on any other feeding, it being an extremely difficult case, the malnutrition possibly having been the result of a slight brain injury at birth.

Dr. Mixsell concludes from his work that the farina feeding, while not a panacea for all feeding ills, is at least one method of handling difficult cases, and, in selected patients, is accompanied by marked gain in weight and general physical improvement.

N. O. PEARCE.

**FURTHER PROGRESS IN THE STUDY OF THE RELATIVE EFFICIENCY OF THE DIFFERENT MERCURIAL PREPARATIONS:** Walter R. Ramsey and O. A. Groebner (*Amer. Jour. of Dis. of Child.*, Sept., 1920). The treatment of syphilis with the different mercurial preparations is still a haphazard affair. Assuming that the amount of mercury eliminated in the urine during a given time would give a fair index of the amount in the circulation we have been able to draw the following conclusions:

1. Mercurial ointment, 50 per cent, is to be preferred to the less concentrated forms and need not be repeated more often than twice weekly instead of daily. The reason for this is, that the elimination of the mercury begins soon after the administration, the maximum elimination occurring during the following three days, and being fairly complete within five days. When double the amount was used, that is, 2 gm. the elimination was relatively larger. The quantity of mercury absorbed is much increased by friction.

2. Calomel ointment is absorbed but less rapidly and to a less extent than the mercurial ointment and should, therefore, be given in greater concentration.

3. Salicylate of mercury in oil should be given hypodermically twice weekly instead of once.

4. The mercuric chlorid, by hypodermic injections, although the dose is very small, continues to be eliminated for six or seven days. The fact, however, that its use frequently is followed by the appearance of protein in the urine should exclude it from the treatment of syphilis in children.

5. Calomel by the mouth is absorbed in small amounts, and continues to be eliminated for a considerable time so that it is probable that it would be sufficient to give it at intervals of several days, thus avoiding diarrhea.

6. Gray powder is absorbed to a small degree and eliminated rather rapidly so that large doses repeated daily would probably be necessary to maintain mercury in the circulation.

R. N. ANDREWS.

**TREATMENT OF WHOOPING COUGH WITH ETHER INJECTIONS:** Deherridon (*Med. Rec.*, Aug., 1920; Original Article in the *Jour. of Med. Sc.*, May, 1920). Thirty cases reported treated by Dufourt's technique. This consists in the administration of one c.c. in twenty-four hours in children under one year and 2 c.c. in the same period for older children. This is injected for three days in succession followed by a days omission and then one final injection. Injection made in the buttocks and have never done any harm and are not painful if made deeply. There were five failures in the thirty cases. A number of paroxysms after each injection is used as a measure of benefit while the duration of the disease at the time of the treatment is important also.

In one case, a boy age 5, had whooped for fifteen days at a rate of thirteen paroxysms in twenty-four hours. He received six injections of 2 c.c. each and in eight days was free from all paroxysms.

A child age 3 who had whooped for nine days with ten paroxysms a day received four injections of 2 c.c. each. In six days the paroxysms ceased but there was a relapse seven days later of a milder type which yielded in four days to three injections.

In one patient who had developed bronchopneumonia it served incidentally as a stimulant. The paroxysm of cough which had reached 35 in twenty-four hours improved notably under treatment and after the third injection was reduced in frequency to 15.

R. N. ANDREWS.

## ROENTGENOLOGY

### SUPERVISORS:

C. U. DESJARDINS,  
MAYO CLINIC, ROCHESTER.

R. G. ALLISON,  
SYNDICATE BLDG., MINNEAPOLIS.

### TELEROENTGENOGRAPHY OF THE SELLA

**TURCICA:** C. Harvey Jewett (*Amer. Jr. Roent.*, July, 1920). Author attempts to establish some fairly definite standard of size, shape and normal variations of the sella turcica. The plates of the sella were made with the plate-target distance equal to five feet. By experiment they found that with this plate-target distance there was an increase in the diameter of 5%.

It was found that the normal sella turcicas could be divided into eight groups with a ninth group added for miscellaneous cases.

Group 1. Structurally showed long thin curved posterior clinoid processes with absence of anterior clinoid processes. This group showed the lowest average and highest average measurements of the sella,



both horizontally and vertically; and the highest average anterior-posterior cranial measurements. Group 2. Nearly vertical light weight posterior clinoid processes with wide open infundibulum, and absent or extremely indistinct small anterior clinoid processes. Group 3. Similar to group 1 except for small, slight anterior clinoid processes projecting horizontally backwards. Group 4. Very heavy anterior clinoid processes projecting directly backwards and occupying a somewhat lower level than the tip of the posterior processes. Group 5. Appearance of a shallow floor with very indistinct thick processes and very wide infundibular spaces.

Group 6. Appearance of complete bridging over of the sella turcica, most of the cases showing heavy processes. Measurements of the sella turcica were smallest in this group. Showed also the shortest longitudinal and the longest vertical cranial diameters. Group 7. Similar to group 3 but most cases show anterior and posterior clinoid processes of about equal length with small infundibular spaces. This group is characterized by the greatest weight and the shortest height. Group 8. Similar to group 2. Thin, nearly perpendicular posterior clinoid processes with wide infundibulum spaces; but in addition has small but indistinct anterior clinoid processes.

No definite relation between weight, height and age, and the size or formation of the sella turcica was observed. Unusual conditions of the sella should be closely correlated with other clinical data before coming to any conclusion. R. G. ALLISON.

**EFFECTS OF RADIUM ON NORMAL BRAIN TISSUE:** C. S. Williamson, R. O. Brown, J. W. Butler (Surg. Gyn. and Obst., Sept., 1920). Work undertaken with the idea of determining, as accurately as possible, the safe dosage, the radius of activity, and the degree of reaction produced by a given amount of radium upon normal brain tissue in a known period of time.

In these experiments 50 M. G. were placed directly upon the motor center of the brain of dogs, and were permitted to remain there for 4, 6, 12, and 18 hours. The radium was enclosed in a platinum tube of approximately 0.4 M. M. thickness, which removed the Alpha and practically all the Beta rays, but permitted the passage of the Gamma rays. The protocol of six experiments are given with gross and histological changes in the brain tissue. They cite the following conclusions.

1. The Gamma rays after passing through 0.4 M. M. of platinum penetrate brain tissue and have a destructive action within a radius of 5 M. M., with a dosage of 900 M. G. hours.
2. The effect upon the blood vessels varies according to the distance from the radium and the number of hours employed.
3. The experiments give assurance that, in the case of these brain tumors which respond readily to radium little or no damage will be inflicted upon the brain

tissue surrounding the tumor, if the radium is implanted in the growth. The dosage employed on the growth can be regulated so as to be destructive only to the periphery. R. G. ALLISON.

## BOOK REVIEWS

**A MANUAL OF PHYSICAL DIAGNOSIS.** By Austin Flint, M. D., L. L. D. Eighth edition, revised by Henry C. Thacher, M. S., M. D. Lea & Febiger, Philadelphia and New York. Price \$3.00. 1920.

In the eighth edition, as in the previous ones, the merits of the book depend on the strong appeal for more careful examinations in searching systematically for the smallest physical signs. These, once located, should be scrupulously analyzed by which manner, more frequently, will correct diagnosis be established and gross errors avoided. It brings very forcibly home, the bitter truth of the modern age, to relegate only too frequently diagnosis to the laboratory. By this procedure clinical observations receive a secondary role in arriving at a diagnosis, which not infrequently is incorrect, bearing out the often repeated statement that a good diagnostician neglects no examination that might contribute a valuable finding, in making a correct diagnosis.

It is almost superfluous to say that the physical signs in this book are considered both in health and disease, and therefore, the differences are so well contrasted, that it requires but little attention in reading, to obtain an invaluable amount of information, both in observing these phenomena and in interpreting their significance. The simplicity, directness, and exactness are additional factors which run through the book, and aiding and facilitating the reader in comprehensively grasping every detail of the subject under discussion.

Then, needless to mention, the medical knowledge obtained during the last few years, both abroad and at home, in peace and in war, during normal conditions of health and disease and abnormal conditions (e. g. epidemics of influenza, trench fever, yellow fever, deficiency diseases) is duly embraced in this volume, making a work most commendable to anyone interested in the progress of medicine.

J. A. LEPAK.

**PSYCHOSES OF THE WAR.** H. C. Marr, Lt. Col., R. A. M. C. (Temp.) Published by the Joint Committee of Henry Frowde and Hodder & Stoughton, London. \$6.50.

This volume presents the subject of abnormal mental states as observed in war. It covers the psychoses in a general way, various functional nervous conditions and also mental deficiency. It is based on the result of observations of some 18,000 officers and men and these about equally divided between psychoses and functional nervous states. It emphasizes the fact that the war developed nothing new either in psychoses or in functional neuroses

but brought out the same pictures seen in civilian life. The various subjects are illustrated by numerous case histories. It is an interesting work—well written and easily understood.

EDWARD J. ENGBERG.

**STUDIES IN NEUROLOGY** (in two volumes). By Henry Head, Oxford Medical Publications, 1920. \$17.00.

This two-volume work is for the most part a republication of a series of papers by the author and several associates, covering several distinct themes dealing with various aspects of the functions of the nervous system.

Volume I deals extensively with methods of sensory examination and the clinical application of these methods; with the peripheral nervous system, especially from the standpoint of injury to the peripheral nerves, quoting extensively from "A Human Experiment in Nerve Division", in which the author himself submitted to an experimental excision of a segment of the radial nerve and of the external cutaneous nerve and suture.

Volume II deals with the spinal cord and its afferent impulses, with discussion of cord injuries, also the brain, with special reference to cerebral cortex and sensation, with sensory disturbances in cerebral lesions.

The work is printed upon good paper, is well arranged and has many interesting diagrammatic illustrations.

W. H. HENGSTLER.

**WAR NEUROSES AND SHELL SHOCK.** By F. W. Mott, M. D. Oxford Medical Publications, 1919. \$6.50.

This volume covers the subject of the various types of neuroses seen under war conditions and discusses the views of the German and French as well as of the English. There are also some interesting and instructive chapters on the physical affects of concussion and of carbon monoxide poisoning and of the effects of irritant gases on the nervous system.

The illustrations are interesting and add materially to the explanation of the conditions presented.

EDWARD J. ENGBERG.

**THE SYMPATHETIC NERVOUS SYSTEM IN DISEASE.** By Langdon Brown, Oxford Medical Publications, 1920. \$4.25.

This excellent little book is based upon the Croonian Lectures given before the Royal College of Physicians in London in 1918. It does not go into an exhaustive and detailed account of the anatomy of the sympathetic system, but rather brings out the principle plan of it. The author sets forth very clearly and simply the relations of the autonomic system to various large groups of disease, and shows the close interaction of the sympathetic nervous system with the various bodily functions, glandular, reproductive, digestive, etc.

It is a very handy and satisfactory little reference work and one especially adapted to the needs of those who are not students of neurology.

W. H. HENGSTLER.

# PHYSICIANS LICENSED TO PRACTICE MEDICINE IN MINNESOTA AT THE OCTOBER (1920) EXAMINATION

## BY EXAMINATION

|                              |                                    |                                       |
|------------------------------|------------------------------------|---------------------------------------|
| Boothby, Walter M.....       | Harvard, 1906.....                 | Rochester, Minn.                      |
| Cosgriff, Jas. Arthur.....   | Northwestern, 1920.....            | Minneapolis General Hospital.         |
| Hartley, Everett C. Jr.....  | U. of Minn., 1918.....             | Carver, Minn.                         |
| Haskins, John LeRoy.....     | U. of Minn., 1916.....             | Minneapolis, 707 University Av. S. E. |
| Irvine, Geo. B.....          | U. of Ill., 1920.....              | Minneapolis General Hospital.         |
| Jensen, Louis Christian..... | Northwestern, 1920.....            | Minneapolis, 914 Elliot Av.           |
| Moss, Myer Norman.....       | Jefferson, 1919.....               | St. Paul, 641 Grand.                  |
| Ogden, Warner.....           | Harvard, 1920.....                 | St. Paul, 546 Holly.                  |
| O'Leary, Paul Arthur.....    | Long Island Coll. Hosp., 1915..... | Rochester, Minn.                      |
| Wood, Thos. Henry.....       | U. of Ill., 1909.....              | Rochester, Minn.                      |

## THROUGH RECIPROCITY

|                              |   |                                  |
|------------------------------|---|----------------------------------|
| Donohue, Philip F.....       | St. Louis U., 1920.....                 | St. Paul, 1481 Summit Av.        |
| Duiker, Henry.....           | Rush, 1920.....                         | Hibbing, Minn.                   |
| Eisele, David C.....         | U. of Mich., 1917.....                  | Coleraine, Minn.                 |
| Frost, Harry T.....          | Northwestern, 1920.....                 | Crookston, Minn.                 |
| Good, Brooks David.....      | Tulane, 1919.....                       | Biwabik, Minn.                   |
| Gumbiner, Alfred A.....      | Long Island Hosp. Med. Coll., 1902..... | Rochester, Minn.                 |
| Halenbeck, Philip L.....     | Rush, 1919.....                         | Crosby, Minn.                    |
| Hutterer, Edward George..... | Sioux City Coll. of Med., 1907.....     | Cold Springs, Minn.              |
| Kline, Harry W.....          | Hah. Chic., 1919.....                   | Anoka, Minn.                     |
| Kramer, Gabriel B.....       | Baltimore Med. College, 1907.....       | St. Paul, care of City Hospital. |
| Mattill, Peter Milton.....   | Rush, 1919.....                         | Hibbing, Minn.                   |
| Osborne, Earl Dorland.....   | U. of Mich., 1909.....                  | Rochester, Minn.                 |
| Pierson, Claude M.....       | Trinity, 1901.....                      | Ambrose, N. D.                   |
| Rundlett, David L.....       | Tufts, 1901.....                        | Sioux Falls, S. D.               |
| Shastid, Thos. Hall.....     | U. of Vermont, 1888.....                | Duluth, Minn.                    |
| Stevenson, Frank W.....      | Rush, 1919.....                         | Minneapolis General Hospital.    |
| Walker, Ralph Eric.....      | U. of Mich., 1907.....                  | St. Paul, 1111 Lowry Av.         |
| Wilson, Edmund W.....        | U. of Iowa, 1896.....                   | Rolfe, Iowa.                     |



# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### COMPULSORY HEALTH INSURANCE AND THE MEDICAL PROFESSION.\*

By FREDERICK L. HOFFMAN, M. D.

*Third Vice President and Statistician, The  
Prudential Insurance Company.*

Mr. Chairman, Ladies and Gentlemen:

It is a great pleasure to have an opportunity of addressing you on this important subject, more so after the eloquent remarks of the President of the Association, in which he touched upon certain phases of a question to which I have given extended consideration.

The propaganda for health insurance is in my judgment the most insidious as it is the most unnecessary effort to disturb the public mind on problems the solution of which lies in totally different directions. The propaganda has been forced upon the American public by an association professionally engaged in disturbing the public mind. It has reached a momentum which can no longer be ignored, particularly on the part of the medical profession, directly concerned. Apathy is as dangerous as indifference is inexcusable. The British Medical profession in 1910 missed its opportunity through the want of preparedness. Fortunately in this country, particularly in California and New York, the medical profession was aroused in time and made its opposition felt. No health insurance act can possibly be worked without the hearty cooperation of the medical men appointed to administer medical benefits; but no hearty cooperation is possible under any conditions which impose a state of bondage upon men heretofore free in the pursuit of a calling than which none is entitled to more respectful consideration.

In Great Britain 14,000 to 15,000 doctors are

hopelessly in bondage to the Government under an agreement which practically precludes the possibility of effective and far-reaching reforms. The medical profession was not consulted in the framing of the Act, nor was it ever—nor is it over here—fully in the confidence of the Government. The negotiations have therefore been mostly one-sided and in practically all essentials the British Medical Association has been compelled to accept the policy of the Government. This is particularly true of the terms of remuneration, of the income limitation, of the limitation of panels, of the restrictions on panel transfers at death, and last, not least, of the right of appeal to the Courts in cases of controversy or dispute. In all these important essentials the doctors have virtually been compelled to accept the policy of the Government dictated primarily by lay minds and for political objectives.

National health insurance affects every phase of social and economic life. It concerns not only the medical profession, but the pharmacist or druggist; the care of the poor; the proper methods of insurance; the freedom of labor and the cost of production, in national and international competition. It may safely be asserted that no sound social or economic principle underlies national health insurance, but that the measure throughout is primarily one of political expediency, intended to serve the purpose of relief as an offset to industrial unrest and discontent, regardless of plausible assurances of prevention and remedial benefits.

In Great Britain national health insurance is administered with an unusual degree of administrative efficiency. It would be utterly impossible under our form of government to reproduce the ability and public service capacity of the average British civil servant. It goes without saying that politics, in the sinister sense of the term, would play a much more important part in the administration of health insurance

\*Address given before the Minnesota State Medical Association, St. Paul, Minn., October, 1920.

in this country than abroad. All the glittering assurances of success rest upon guesswork and audacious assumptions. Those who are making propaganda for health insurance are not concerned with the patient, the doctor or the pharmacist, but their sole interest lies in the enormous administrative machinery which would come into existence to administer the act.

The British administration is of colossal proportions. The rules and regulations defy the human understanding and the man does not live who masters more than a fraction of the whole. The new medical benefit regulations cover 70 specific rules in closely printed type of 50 pages. These rules are subject to frequent changes and amendments and hardly has one set of regulations become well-understood when a new set is inaugurated in place thereof.

The British Act provides, in brief, that any person insured under the system is entitled to free medical care, or such as an ordinary practitioner would be expected to be able to render. Aside from medical benefit, the insured person receives a weekly cash benefit for 26 weeks of sickness duration, after the third day of illness, amounting to 15s. a week in the case of men and 12s. a week in the case of women. When the sickness extends over 26 weeks a disability benefit is paid, which amounts to 10s., for the remainder of the illness, irrespective of its duration. Furthermore, the Act provides for a maternity benefit of 40s. in the event of a confinement of an insured wage-working woman or of the wife of an insured wage-earner, or both.

Under the original Act a sanatorium benefit was provided for the tuberculous, but in practice the phraseology was so modified as to grant virtually unlimited powers to the Insurance Committees unable to square with the public expectations of first-class institutional treatment in the event of tuberculosis requiring sanatorium care. So-called domiciliary or home treatment therefore became the rule rather than the exception, with results far from satisfactory. In consequence the Government recently has enacted that the sanatorium benefit is, after January, 1921 to be provided for by the public authorities under the direction of the Ministry of Health.

I have restated these fundamental principles of the Act since they are frequently obscured

or overlooked. It must be clear to anyone who gives extended time and thought to the question that the relief portion of the Act is uppermost in the public mind. And it is in this particular matter that the political aspects of the Act are most disturbing, since the demand is continually for more and more, the aim being to bring about practically an equalization of wages not earned during sickness equivalent to the wages earned while at work. If the question had been faced squarely as an economic problem conditioned by the aim of maintaining the wage-earners' standard of life, the entire matter would have offered a much more simple solution, in the manner of conceiving unemployment for any cause as a fundamental basis of assistance in whatever form or however provided, including medical attendance, maternity assistance and a long line of supplementary benefits suggested at one time or another by those best familiar with the needs of wage-earners and their dependents. By making incapacity for work the basis of a claim for sickness benefit it is clearly recognized that it is the unemployment of the person that constitutes the claim for free medical attendance, etc., as the case may be. Under the new unemployment insurance law practically the same wage-earners will be insured under another system with a vast bureaucratic force employed in its administration and countless rules and regulations governing the most minute details of governmental or organization activities. It must be clear that a colossal blunder was made in not conceiving the proposed measures of relief rightly as an economic rather than as an insurance function, for as a matter of fact the term insurance as used in the present sense is a complete misnomer. The contributions are totally insufficient to meet the demand upon the funds, and vast Parliamentary grants are required to meet the deficiencies that would otherwise arise. As best illustrated in the present case of sanatorium benefit, the insured person receives precisely the same treatment as an uninsured person entitled to sanatorium care under the Poor Law, or of a person paying privately for the accommodation as an ordinary patient.

The subject is one of such vast extent and so complicated by special considerations, customs and usages as to preclude adequate presentation on an occasion like the present one where



brevity is necessarily of the first importance. I was about three months in England last year for the purpose of a personal investigation incidental to other duties connected with an investigation into the effects of the war on insurance, and I brought together what is probably the largest amount of evidence extant on the subject in this country. I had the most hearty cooperation of government officials and of private persons in high position and many others representative of every grade of society more or less directly affected by the operation of the Act. The results of this investigation are in course of being brought together in a series of special papers which will be available to those who may care to examine further into matters of detail. In brief, my conclusions are decidedly adverse to national health insurance as a measure promoting the pauperization of the people, leading to further stratification of industrial society and to unworthy class distinctions fostering social discontent while encouraging socialism, communism and every type of socialization opposed to the existing order.

There has been no improvement as the result of national health insurance in the health of the people, strictly conceived, nor in the public health activities of the nation, regardless of the expectations of the measure when enacted in 1911. The so-called medical benefit has degenerated into offhand medical advice, superficial consultations amplified by a bottle of medicine, concerned chiefly with trivial complaints, while major or serious complaints are as ill-cared for as ever. On an average, and I speak from personal observation, in a number of panel doctors' offices, the amount of time devoted to a consultation is about five minutes. The general impression in large panel offices in congested industrial districts is that the services obtained conform to the traditional methods of Poor Law medical relief. There is neither the time nor the inclination for thoroughness in treatment, nor an inducement for the panel doctor to rise in professional efficiency above a mediocre average.

Since drugs are provided free, there has unquestionably been an increase in the demand for "a bottle of medicine," frequently as harmless as useless. Drug prescribing is subject to stringent rules and regulations, since economy is of the first importance. All prescriptions are

priced by so-called Drug Pricing Bureaus, averaged at the end of the month, and the doctor whose average quota of prescriptions or average drug expense exceeds a certain standard, is required to appear before the Panel Committee and offer an explanation, which if unsatisfactory results in a fine which may assume serious proportions.

It is my deliberate conclusion that the social and economic status of the lower class of physicians has been appreciatively raised, but that at the same time the standard of the higher class has unquestionably been lowered. There is no longer the clear sense of active competition, but entirely too much time and thought is wasted on deliberations which concern questions of remuneration and conditions of medical practice. The panel doctors' offices which I have visited have left the distinct impression of a routine practice more concerned with medical amelioration than with effective methods of cure. It is appalling to see so large a number of persons treated in a superficial manner, largely because it is a natural assumption that in the majority of cases the ailment is either trivial or imaginary. In the smaller provincial towns conditions of panel practice are much better. I have been at some where they were certainly as good as the better class of private practice. This would suggest the advisability of drastic panel limitations, but the outlook in this respect is impaired by the raising of the income limit, as the result of which opportunities for private practice have been curtailed. A physician with a good sized panel <sup>may to</sup> fairly large private practice can not possibly do justice to both. Yet it is difficult to make a living from a small panel practice, of which a large number exist throughout the country. For, if there are 14,000,000 people insured, and 14,000 panel doctors, the average panel is only about 1,000 names to a doctor. A thousand names means a gross income from panel sources of 11,000 shillings, or £550, of which the present equivalent in American currency would be about \$1,900. In Manchester the remuneration is on the basis of attendance. In the aggregate, however, the compensation is the same, for there is just so much money in the pool for distribution, and the result is that doctors generally receive possibly eighty per cent of what they expect. The bills rendered are on the assumption of a fee of

about two shillings (or about 50 cents) per attendance. The average experience in England shows, however, that less, and some times considerably less, than this is received. In other words, there is a large amount of work for relatively small pay. The aggregate results are to the economic advantage of the doctor, contrasting his present secure position with an insecure practice among poor people in the past.

The possibilities of dissatisfaction are enormous. While prosecutions are relatively few, this is largely because of the amount of bureaucratic energy involved in disputes and prosecutions. Doctors are heavily fined or surcharged on all sorts of charges. Their right of appeal has been abridged and there is no appeal beyond the decision of the Ministry of Health, which is final. There has therefore developed a new movement, which is rapidly gaining force, for a change in the status of the British Medical Association from a professional society to that of a trades union. The threat of a strike does not so much involve the patients as it concerns the Government; for a strike under national health insurance would simply be equivalent to a collective refusal to serve the Government on the terms offered, and there would be a reversion to the earlier condition of unrestricted private practice. The St. Paul papers of to-day are announcing a strike of some 4,000 doctors in Vienna. Such strikes, under sickness insurance, are by no means uncommon.

In brief the situation is one of chaos, with no possible hope of a material improvement. The Ministry of Health, which has charge of the supervision of medical practice under health insurance, has developed into an immense bureaucratic machine. Every day additional duties and functions are assumed by the Ministry aside from totally alien activities not concerned directly with public health administration, such as old-age pensions, the poor-law, and housing reform. Yet whatever one may say or think about the British system, it certainly has come to stay. In 1601 Great Britain adopted a poor-law, which, regardless of every effort at fundamental change or modification, remains to the present day unchanged in its sinister influence upon the social life of the people. In much the same manner efforts to improve panel practice have failed. Unquestionably the medical pro-

fession is more satisfied to-day under the new terms of remuneration than eight years ago, but as emphasized by a letter from the secretary of the Medico-Political Union, which I hold in my hand, the changes which the new regulations were thought to bring about have fallen far short of expectations.

Of the many evidences of the curtailed rights and privileges proposed, the most important is the abridgement of the right to transfer panels by sale at death as invested interests. Anyone reading *The Lancet*, or the *British Medical Journal*, is familiar with the columns of advertisements of medical practices for sale, including a panel frequently of considerable size. Regardless of the strenuous opposition on the part of the British Medical Association, the regulation was adopted that in the future the redistribution of the panel at death must be made with the sanction of the Ministry of Health. All this is but evidence of the growing power and control on the part of the Government over the medical profession. The old freedom of private practice has hopelessly gone. To the young doctor entering the profession there is to-day practically no alternative but to seek a panel wherever he can find it, or however he can secure it. There is a curious dearth of definite information on the subject as to how conditions are expected to develop in the future. With diminished opportunities for private practice and a definite limit to the number of names which a panel doctor can call his own, the outlook is not encouraging.

It is not going too far, therefore, to maintain that the present method is practically the equivalent of a quasi system of state medicine. The trend is obviously in the direction of a public medical service. It is a foregone conclusion that the Ministry will not be satisfied with a condition of uncertainty requiring the reopening of negotiations every year or two under the threat of a strike. The panel doctors now are virtually state employees. A panel doctor can not take a vacation, or change his office hours, or his office location, etc., without permission from the Ministry of Health. The time is bound to come when the state will insist upon whole-time doctors, exclusively devoted to panel practice. State medicine today is a different conception from prevailing ideas a generation ago. Public health



discussions are no longer limited to the medical profession but are practically common to all people. The doctors are playing directly into the hands of lay reformers who make far reaching promises impossible of fulfillment. This is largely because of the false and vicious conception that the doctor is primarily concerned with the prevention of disease. The practice of medicine as a healing art concerns totally different matters than the administration of public health, including public and private, or personal hygiene. The prevention of death from disease is a very different matter from the prevention of disease occurrence. No more is the physician a health officer than that there is imperative need that a health officer should be a physician. The public to-day is led to expect from the medical profession that for which it is neither trained nor qualified. Group medicine, of which we hear much, is but a step in this direction, but group medicine concerns the diagnosis of existing disease and not the prevention of the onset of disease. In so far as consulting clinics aid in the earliest possible diagnosis they certainly perform a most useful, if not indispensable, health function. In many large corporations this fact is clearly realized and much good work is being done. Those who wish to grasp the new viewpoint should read a recently issued book on "The Future of Medicine," by Sir James Mackenzie, which is an epoch-making treatise opening new vistas of medical possibilities.

Many years ago, at the Maryland Tuberculosis Congress, the late Sir William Osler, in a seathing address, accused the people of Baltimore in the matter of disease prevention, of apathy, apathy, apathy! The same charge can be brought to-day against the medical profession's indifference to the dangers that menace its future. Apathy in the matter of health insurance propaganda is a betrayal of a precious professional interest. Those who are making propaganda for health insurance are neither of the medical profession nor connected with public health administration; they are almost entirely laymen interested in creating new offices and new opportunities for lay people to control the practice of medicine as a healing art. They are without experience and without the required knowledge of what is taking place in Great Britain and on the continent of Europe. There has been no

thorough investigation of the whole question, and the work of the committee on social insurance of the American Medical Association may be referred to as a grotesque perversion of a duty of profound importance not only to physicians but to the public at large. The people have a right to know the truth and nothing but the truth. If health insurance is for the advantage of the people it should be adopted; if, to the contrary, it is opposed to public interest, the agitating propaganda should be brought to an end by a full exposure of what I believe to be its unworthy and selfish motives. Doctors are very busy men, engaged in the most important of all functions—the treatment and cure of disease. It is of the essence of cruelty to impose upon them the additional duty to thoroughly consider a mass of information largely irrelevant, relating to so-called health insurance, yet that duty can not be shifted. It is a question of preserving an ancient art and craft against the designing assaults of a small group of professional propagandists chiefly under the guidance of the so-called American Association for Labor Legislation. That organization has no standing with organized labor and is serving neither a necessary nor a useful purpose. In so far as health reforms are urgently called for, they are matters of public health administration much more than of medicine as a healing art. Reforms in public health administration—federal, state and municipal—are needed but such reforms should be the result of deliberate consideration of the experience that has been had at home and abroad, pointing the way towards better results. There is enough ability in this country to formulate a plan acceptable to all concerned; but no one familiar with our far-reaching progress during the last thirty years can in justice ignore the extraordinary efforts that have been made in practically every state and community to raise the level of health and social well being of every element of the American population. We to-day have the lowest death rate, as we have the lowest sickness rate, of any people on earth. Our experience during the war has shown that our men represent the finest fighting stock extant. Our medical war record is one of which we have every reason to feel proud. Our future progress lies in the direction in which our past progress has

been achieved, modified, of course, in the light of the new knowledge and the new discoveries in the realm of disease prevention and control. We have very little to learn from any system of health insurance abroad otherwise than the one fundamental lesson that it will be best for us to leave this fatuous experiment in applied socialism severely alone.

### ACUTE GONORRHEAL URETHRITIS\*

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So soon as the medical profession considers gonorrhea, its complications and sequelae, in the important light which it deserves, only then will scientific thought be given to the treatment of this widespread and devastating infection.

The genito-urinary surgeon and the gynecologist recognize the fact that gonorrhea plays a paramount role and its results are such that its effect upon mankind in general is so stupendous that it is unbelievable.

Some general practitioners have already begun to realize what gonorrheal infections mean, and frequently they arrive at an opinion that the disease is incurable on account of the difficulties which they have encountered eliminating the infection.

Gonorrhea has been known for many years, but it was only recognized scientifically in 1879 by the discovery of the cause by Neisser. He discovered an intracellular, biscuit-shaped diplococcus which was always found in the discharge in these cases, which had peculiar straining properties and would grow upon special culture media. This bacterium has been termed the gonococcus.

To gain the best results in the treatment of gonorrhea, the diagnosis is all important. All discharges from the urethra must not be considered gonorrhea by any means. Here is where the physicians make their first mistake. The diagnosis can be made accurately only with the microscope and culture-tube.

The diagnosis is not always so simple as it may seem. The fact that an individual has been exposed and has a discharge from the

urethra is no indication that he has gonorrhea. He may have a simple infection due to other bacteria than the gonococcus which resembles gonorrhea so closely that from signs alone it would be impossible to differentiate. The common bacteria found in non-specific infection are: *staphylococcus*, *B. coli*, *streptococcus*, *monococcus catarrhalis*. These, with the exception of the latter, are easily told by the microscope. The *monococcus catarrhalis* is more frequently mistaken for the gonococcus. It groups itself similarly, has the same staining qualities, and is Gram-negative. An experienced laboratory worker can frequently differentiate between the two by microscopic examination. The onset of the disease differs in the two infections. Gonorrheal infection has a longer period of incubation than the infection produced by the monococcus, but this is difficult to ascertain, for some patients may have two or three different exposures in the course of a week, the symptoms making themselves manifest a few hours after the last, and yet the urethra may have been infected by the exposure a week previous.

In arriving at an accurate diagnosis between these two infections, one must resort to the culture-tube. It is well known that the gonococcus is very difficult to cultivate and will grow only upon special media and in proper environment, whereas the *monococcus catarrhalis* grows rapidly upon almost any media; within twenty-four hours the culture will show a profuse and abundant growth.

Why this lengthy discussion upon *monococcus catarrhalis* infection? We wish to make clear the differentiation and symptomatic characteristics. We believe this condition is frequently mistaken for gonorrhea. In the majority of cases, when the discharge is cleared up in a few days with simple treatment and the surgeon flatters himself on his ability to handle cases of gonorrhea, he may have been dealing with this simple infection.

Other conditions which produce discharge from the urethra are intraurethral chancre and acute exacerbations of chronic urethritis, prostatitis, and similar conditions which have been considered healed. It is many times difficult to diagnose urethral chancre from the clinical evidence, but the microscope and culture again play an important role. The Wassermann reac-

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tion will not be of help as it may be too early for this test to show.

Presuming, therefore, that we have a typical, clear-cut case of urethritis, with a well defined history and a characteristic symptomatology, discharge of pus from the meatus, which is red, swollen and edematous, urethral burning on micturition, with a peculiar drawing sensation along the canal, with diplococci found in the pus microscopically. These are Gram-negative, intracellular, will not grow on ordinary media within twenty-four hours and do grow upon special media. Then, and then only, it is certain that we are dealing with a specific urethritis.

From the complications and sequelae of gonorrhea which come under the care of the specialist for treatment it is evident the treatment of acute anterior gonorrhea is either unskillful, ignorant, or both. Both the physician and the patient may be in error. When some of our modern teaching regarding treatment of gonorrhea is both illogic and unscientific, what can be expected. Rules are laid down whereby the physician is instructed to never begin local treatment of acute gonorrhea until the acute symptoms have abated. This method has come down to us through a decade or more of teaching, and has done more harm than anything else in preventing scientific advancement in this work.

We have to deal with an infection produced by a specific organism which soon burrows into the underlying structures and there produces marked pathologic changes. Why, therefore, should treatment be delayed? Delay surely increases the area of infected mucosa and also endangers the posterior urethra to infection. Involvement also of the more important structures, as the prostate, seminal vesicle, and epididymis, which will surely follow, may produce serious complications and grave sequelae.

It has been the teaching, also, that posterior urethritis should *not be considered a complication*, but is the natural course of the disease. This is absolutely true if the case is allowed to progress without adequate treatment. From observation and treatment of many cases, we disagree with this teaching. We thoroughly believe that with proper treatment posterior involvement will rarely occur and we are also thoroughly convinced that posterior urethritis should *be con-*

*sidered a complication* and a very annoying and serious one at that.

What do we mean by adequate treatment?

We have said above that we have to deal with a specific infection which usually is a surface infection early, localized in a small area in the anterior urethra which ordinarily can readily be reached with local applications. There are no logical reasons why we should treat gonorrhea otherwise than surgically. The patients should be instructed to consult the physician just as soon as possible after he has noticed his discharge, thus preventing him from taking treatment suggested by friends or prescribed by druggists to his detriment.

*Treatment should be administered at the earliest possible moment, just as soon as the patient presents himself and as soon as the diagnosis is properly made.* It has been our practice for many years to begin treatment immediately. This consists in hand injections, always administered personally and never left to the patient, unless the circumstances are most extraordinary even though the symptoms are only a few hours duration.

*The earlier the treatment is begun, the shorter the duration of the attack and the less liability to complications and sequelae.* The reason for haste in the treatment of these cases is apparent. The sooner the gonococci are attacked the better for the urogenital tract of the patient.

The reason for personal administration of these injections is the total lack of experience and judgment of the patient necessary for the proper technique, no matter how capable the patient may think himself. We have never seen a patient give himself an injection properly. It is a rare occurrence for the physician to carefully instruct the patient in the proper method to employ, and, even then, the patient is very liable to be careless about following his instruction. Is it any wonder then that the patient who treats himself invariably does himself more harm than good?

The *modus operandi* as followed in our practice is simple but strenuous. The patient is instructed, after slides have been made for examination, to pass his urine into two glasses, six or eight ounces in the first and the balance in the second. If the urine in the first glass is cloudy and opaque and the second clear, one can,

with a reasonable degree of certainty, depend upon the fact that the anterior urethra only is involved.

The patient is then placed upon the table in the dorsal position. The penis is examined, particularly as to the meatus. If this is below 16 F. a meatotomy must be done immediately, cutting the meatus up to 28 or 30. This will prevent blocking or the discharge and will reduce the chances of posterior infection to a minimum.

If everything is normal, an injection is given into the anterior urethra with the use of a syringe which holds about 6 to 8 c.c. This is fitted with a detachable soft rubber nozzle. These nozzles can be easily sterilized by boiling, thereby overcoming the danger of contamination.

The penis is grasped by the left hand, the meatus separated by the thumb and forefinger, the nozzle gently inserted and the injection allowed to gently and slowly trickle into the canal. No force is necessary. In fact, it is contraindicated. The anterior canal is filled to slight dilatation, which can be readily felt by the fingers of the hand grasping the penis as close to the meatus as possible, with just sufficient pressure to retain the fluid. He holds the injection within the urethra for at least ten minutes. The injection is allowed to pass out into gauze or cotton and a protecting gauze covering placed over the meatus. The patient is instructed to hold the urine for at least two hours after treatment.

In severe cases the patient is instructed to return three times daily for treatment. In ordinary cases twice daily will suffice. The solutions that are employed for the infection may be any of the milder silver salts as protargol, 1 to 2 per cent; argyrol, in full strength; albargin, 1 to 2 per cent, etc. We have employed as routine for eight or ten years 2 per cent solution of nargol and found it most satisfactory. The treatments for the second day are usually the same as for the first. The discharge should be examined microscopically daily, and when the discharge has ceased, with no evidence of gonococci in the shreds in the urine, with only a few pus and epithelial cells, the treatment should be changed. When this occurs the condition of the urethra needs stimulation to restore it to the proper tone, as there is lowered urethral vitality. Here we employ anterior irrigations of hot potassium permanganate solution, 1-8000;

zinc-sulphate solution, 1-6000; picric acid, 1-8000. Generally we have better results with potassium permanganate as a routine. In a few days, with this form of treatment given daily, we see the shreds and particles rapidly disappear from the urine.

If the treatment is carefully followed as here outlined, where the infection is primarily anterior the posterior urethra will rarely become involved and the patient will be saved from the annoyance, discomfort and dangers of posterior urethritis, and the duration of the attack will be surprisingly short. It is remarkable, in many cases, to see the benefits of this treatment. It must not be forgotten that it is absolutely criminal to instrumentate an acutely inflamed urethra.

The most frequent complication of acute anterior urethritis is involvement of the posterior canal. Here, as well as in the anterior urethra, we must exercise every effort to clean up the condition as rapidly as possible to prevent progress of the infection.

Posterior infection is usually readily diagnosed, both from the symptoms and from the characteristic appearance of the urine in the tow-glass test. The patient will complain of a frequency of urination as often as every fifteen or twenty minutes, as well as an inability to hold the urine when the desire strikes him. The two-glass test will show that both glasses contain pus, are cloudy, and usually opaque.

The treatment here is similar to that in the anterior urethra. Hand injections are used, never, however, administered by the patient. Here we employ a syringe of 20 cc. capacity, fitted with a soft-rubber nozzle, so that not only is the anterior urethra filled, but we have sufficient to fill the posterior urethra as well. The injection is gently given and the patient is told to make the endeavor of passing the urine. This produces muscle relaxation and the solution will run easily, without using force, into the posterior canal. The penis is grasped similarly as in anterior treatment. The entire urethra is filled. The meatus is held by the patient to prevent the solution from running from the urethra. This is held for from five to ten minutes. It will be necessary to give two or three treatments daily. The same solutions are employed that are used in the treatment of anterior conditions. The



posterior involvement will clear up surprisingly. The symptoms may entirely disappear after a day or two of treatment and the second urine becomes clear again. Just as soon as this occurs stop posterior injections and give all of your attention to the anterior urethra.

Aside from posterior urethritis, the most frequent complications of anterior urethritis are phimosis, paraphimosis, peri-urethritis, abscess of the glans of Litre, and occasionally inguinal adenitis of a suppurative variety. Phimosis may occur where the prepuce is unduly long or unduly tight. The part becomes swollen and edematous, and it is difficult or impossible to retract the prepuce over the glans. Hot applications are of service. If the edema is severe, multiple punctures with a needle will relieve the condition. If the swelling continues and the phimosis is not reduced by any of these methods, we do not hesitate to do a dorsal slit or a complete circumcision. Paraphimosis is fortunately not so common a complication; here the prepuce is retracted well over the glans, becomes edematous and swollen, and cannot be reduced. Manipulations will sometimes bring it forward. This may be done by grasping the penis between the first two fingers of each hand and by gently pulling forward with the fingers and pressing upon the glans with the thumbs. Here, also, hot applications and multiple punctures may be of service. If it is impossible to reduce it and there is much constriction on the dorsal surface produced by the swelling, it will then become necessary to cut the constricting band. This is best done on a grooved director so that the dorsal vessels will not be injured. If the constriction is not relieved, marked pressure of the dorsal vessels is apt to produce gangrene, sloughing and marked infection, a very serious complication.

Since the advent of beginning treatment of the acute stage early, periurethritis and abscess of the glans of Litre are not encountered so commonly. However, occasionally, no matter what precautions are taken, the surrounding tissues of the urethra may become infected, and we then have the patient complaining of those annoying symptoms, painful erections, with bending of the organ, indicating chordee. For relief of this condition the active treatment of the urethritis is pushed. The patient is told to immerse the

penis in hot water twice daily for from ten to fifteen minutes. At night he may apply an ointment composed of equal parts of unguentum belladonnae and lanolin to the under surface of the penis. If the chordee is persistent, occasionally it will be necessary to use opium and belladonna suppositories at bed time for the relief of the pain. Fortunately the condition clears up rapidly as the infection of the urethra clears up. Rarely do we see periurethral abscesses owing to the treatment that is followed, but they do, occasionally, develop and it is usually the glans of Litre at the fossa navicularis that becomes involved. These soon form small abscesses, which are evident on either side of the frenum at the corona. The pain is usually severe and produces considerable annoyance to the patient. When this occurs it is always best to incise externally and drain after a thorough application of iodine, or carbolic followed with alcohol. Internal incision through the urethra is not employed, as a rule, for fear of further infection or extravasation of urine. By all means open and drain; do not allow these abscesses to rupture spontaneously, as the end result will be a urethral fistula, which is very difficult to heal. As a rule, the radical operation will be followed by perfect healing.

Inguinal adenitis is an occasional complication, but suppuration is usually aborted. Application of iodine will usually suffice. If, however, suppuration does occur, free incision with drainage is indicated.

Another complication of anterior urethritis which occasionally makes itself evident, particularly where the treatment of acute anterior gonorrhea has begun too late, is that of acute infection of Cowper's gland, acute Cowperitis. This, for the most part, is a late manifestation. The patient complains of pain, either mild or severe, with a fullness in the perineum, made worse by exercise or by defecation. The swelling in the gland may readily be mapped out with the forefinger in the rectum and the thumb on the perineum. When this condition occurs the patient should be put to bed, and hot applications applied to the perineum; opium and belladonna suppositories per rectum to relieve the pain if it is severe. It is recommended by some of the text books to stop all local treatment of the urethral condition. We cannot see the logic of

this suggestion. We prefer to continue treatment, being sure that the urethra is well filled at each injection. We are thoroughly convinced that the dangers of abscess formation in this location will be less if urethral treatment is continued. However, abscess will sometimes occur, no matter what precautions are taken. The onset is usually ushered in with a chill, with increased swelling and pain, followed by a rise in temperature from 101 to 104 F. Redness and swelling may soon be recognized in the perineum. Owing to the non-elastic structures of the perineum there may be marked pressure which will result in urinary disturbances, characterized by frequency of micturition with pain, with difficulty in starting the stream, or even occasionally with complete retention, if proper treatment is not instituted. The abscess may rupture spontaneously either in the urethra, rectum or perineum. This should not be allowed to occur, as fistulae will follow which are difficult to cure. Abscess of Cowper's gland should be treated similarly to an abscess elsewhere, by free incision and drainage. The incision should be made through the perineum and may, as a rule, be done under local anesthesia. Postoperative treatment consists in overcoming the infection and allowing it to heal gradually from the bottom outwards. This may take a week or ten days to accomplish. At the same time local treatment must be continued *per urethra*.

One of the most dreaded complications which may arise during an attack of acute gonorrhea, is that of gonorrheal arthritis. This usually arises during the acute state of the urethral involvement, most commonly during the third week of the infection. We have not seen gonorrheal arthritis develop in a case of acute infection where we have begun treatment within twenty-four hours after the discharge began—another argument for the early commencement of treatment in these cases.

The condition may develop in one joint or may be polyarticular. Space will not allow us to go into detail regarding various forms and varieties of this condition which are demonstrated clinically. So soon as the pain and swelling are noticed by the patient he should be put to bed and absolute rest of the part affected instituted, which is best accomplished by complete extension. Extension will produce marked

benefit, relieve the pain and separate the articular surface in the joint, a valuable feature to be considered.

Strenuous treatment of the existing urethritis must be carried out. Local treatment to the parts, as the application of heat or ointment, may relieve the pain to a degree. Internally the salicylates have been recommended. We depend almost entirely upon the use of anti-gonococcal serum, which we consider almost a specific. However, we are in the habit of administering larger doses than are usually recommended. It is not uncommon to inject 5 to 10 c.c. as an initial dose, to be repeated within twelve hours if necessary, followed by daily doses of 2 c.c. if the condition is not markedly improved. We have seen a severely affected joint causing the patient considerable discomfort clear up from one injection of serum. *Do not forget to treat the local urethral infection. This is absolutely essential.*

Systemic gonorrheal infection, as endocarditis or myocarditis, fortunately, is rare. The gonococcus may be found in the blood, and bacterial growths may be made from blood culture. Here, absolute rest is essential. Marked attention to the urethral condition and the serum form of treatment are indicated. Medical treatment is also necessary.

We have already shown that a posterior urethritis is a complication well to be avoided, as the adjacent tissues may become involved. We know of no condition which may arise which will give the physician more concern and produce greater discomfort to the patient than acute infection of the prostate.

Infection of the prostate is readily demonstrated from the clinical symptoms and signs. Here the symptoms associated with acute posterior urethritis become exaggerated, the urinary disturbances are more marked, with greater pain and burning associated with the act of micturition. The urine is always, both the first and second glass, quite cloudy, due to the pus; besides, there is usually a dull pain in the perineum and in the rectum, the patient complaining of a sensation of mass in the rectum. There is always a difficulty of urination, which may even develop into complete retention. The diagnosis can usually be confirmed by rectal examination. The prostate can be felt to be enlarged, hot, soft, and exceedingly tender and sensitive



on pressure. The general size and shape of the organ depend upon the variety of involvement. The onset may be accompanied with a chill, followed by fever. Some cases of acute prostatitis fortunately undergo resolution with a rapid cessation of symptoms, but the usual development tends toward abscess, chronic prostatitis, or both.

Here, as with other complications, we believe that the greatest good follows the continuation of our local urethral treatment rather than the cessation of treatment as recommended by some. When the prostate becomes acutely infected, the patient should be put to bed. Hot sitz baths are followed by relief. Hot rectal injections are excellent; opium and belladonna suppositories, if the pain is great. *Massage of the prostate is absolutely contra-indicated.*

If retention occurs and catheterization is necessary, the procedure should be done with the greatest care, as severe trauma may follow careless instrumentation. It is better to leave the catheter in place than take a chance of repeated instrumentations.

The development of a prostatic abscess is usually associated with a rather severe chill, followed by temperature as high as 104 or 105 F. The urinary symptoms are all increased. The patient has more pain. The mass-like sensation of the rectum is increased. Examination per rectum shows a large, very soft, usually slightly fluctuating mass involving the prostate, either one or both lobes.

Just so soon as the diagnosis is made, treatment should be carried out, consisting in a radical surgical procedure. The abscess may go on to spontaneous rupture, but this is not desired; fortunately when this occurs it usually ruptures into the urethra, evacuation takes place, and an ultimate cure follows only after a prolonged chronic stage with much treatment. Occasionally, the abscess ruptures into the rectum. This is undesirable as the result may be urethro-rectal fistula, one of the most difficult conditions to remedy that we have in genito-urinary surgery. It has been suggested that the abscess can be opened intraurethrally. This procedure we do not recommend, as a long, chronic stage may ensue. We prefer to attack the abscess through the perineum, incising the prostatic capsule and evacuating the pus, followed by drainage. We are thoroughly convinced that the condition of

the prostate will clear up very much more rapidly by following this technique. Here, too, we continue our anteroposterior injections for the treatments of the urethral conditions, thus endeavoring to eradicate the cause.

Acute seminal vesiculitis is not an uncommon condition associated with posterior urethritis and prostatitis. The symptoms of the condition are both constitutional and local. The former are demonstrated in a slight febrile movement with accelerated pulse, headache, constipation, and a general feeling of depression. The local symptoms are referable to the urogenital tract. There is usually pain in the perineum, a sense of fullness of the bladder, which continues even when that viscus is emptied, producing thereby considerable tenesmus. Pain may be referred to the sacral or iliac region. Pain on the right side may be mistaken for appendicitis. Conditions of the vesicles must always be considered in obscure abdominal pain. One of the most characteristic symptoms is increased frequency of micturition, both diurnally and nocturnally.

The treatment of acute vesiculitis is very similar to that recommended in acute prostatitis; hot sitz bath two or three times daily. Hot application to the rectum with the use of the psychrophore gives relief frequently. We do not believe that massage of the vesicles in acute infections is warranted. Incision and drainage of the vesicles in this stage of the infection are usually not indicated. Fortunately the vesicles are not so frequently infected as the prostate. Here we have a posterior urethritis associated, so we must continue treatment of the urethral condition.

Acute epididymitis, either unilateral or bilateral, is one of the most dreaded consequences of posterior urethritis, and one which is exceedingly annoying to the patient, as it is accompanied with great pain, which usually incapacitates the patient. Involvement of the epididymis usually occurs during the second or early part of the third week or later.

Associated with the symptoms of posterior urethritis we have the patient complaining of a pain in the groin, followed by the same sensation in the testicle. Soon the pain becomes severe, with marked swelling of the epididymis. The pain is increased by the patient being on his feet or taking exercise. Usually there is not

much fever, not over 100, unless there is suppuration; then the fever may reach 103 or 104. The diagnosis is relatively easy: pain and swelling in the part following an acute gonorrhea. Per rectum the ampulla of the vesicle can be palpated readily.

We will divide the treatment into prophylactic, local and surgical and will endeavor to bring to your attention some of the various forms of treatment that have been recommended for this condition. To our mind prophylactic treatment is of the utmost importance, for if this serious complication can be prevented, we are thus able to shorten the original attack and reduce to a minimum the possibility of such sequelae as sterility, chronic prostatitis and vesiculitis, and the tendency to recurrences of the inflammatory condition of the epididymis.

The prophylactic treatment consists in preventing posterior urethritis and, if this condition is already evident when the patient presents himself, strenuous treatment of the posterior urethra must follow. As epididymitis is a later complication, we have another forceful argument for beginning treatment of the original acute anterior urethritis at the earliest moment. If, however, epididymitis exists, local treatment of the anteroposterior urethra should begin at once. It is our practice to give our patients daily treatments for the urethral condition with hand injections already described. It is better, of course, to have your patient confined in bed, but it is difficult at times to have them do this if they can be possibly kept on their feet. We have tried to devise a treatment that will allow the patient to attend to his daily vocation. This consists in local applications with support of the testes. If the case is seen early, we apply upon gauze the compound iodine ointment, which is placed upon the affected side of the scrotum, completely surrounding the affected area, and the scrotum is then well elevated by a suspensory bandage which we make for this purpose.

The compound iodine ointment is left in place until there is evidence of a distinct burning sensation. It is then removed, the scrotal surface cleansed with olive oil, and the ointment of lead iodine is profusely applied.

It must be remembered that the posterior urethral infection is the cause of the trouble, and that attention must be given this condition. Care,

however, must be practiced in giving the antero-posterior injection. In the majority of cases this form of treatment will suffice and the patient's condition will soon be improved.

There are, however, a small proportion of cases that develop unusually severe types of infection, where it becomes necessary to place the patient at complete rest. In some of these cases, marked suppuration occurs, and here we must depend upon free incision and drainage for evacuation of the pus.

It has been recommended by some that every case of epididymitis is a surgical case, requiring exposure of the affected epididymis with evacuation of the pus, which many times, is only a small quantity. We thoroughly believe that the open operation would be the treatment of choice in most of these cases. Acute epididymitis is rather a rare occurrence in our practice. This proves that early treatment, applied by the surgeon himself, prevents, in the majority of cases, acute complications involving the deep urethra and its adjacent organs.

A further progression of the infection from the posterior urethra into the bladder may be a complication of gonorrheal urethritis which will be accompanied by symptoms of the most annoying character. These are both constitutional and local. The former group are characterized by a mild, febrile movement, headache, backache, suprapubic pain and general malaise. The local symptoms are all urinary, shown by marked frequency of urination, with pain accompanying the act of micturition and continuing after the bladder is emptied; the frequency may be as often as every fifteen minutes, both by day and night. There may be both a microscopic hematuria. A few drops of blood may follow the act of micturition. Examination shows that both of the specimens by the two glass test will contain pus; the second will usually show more pus than the first. If we use three glasses instead of two, all three samples will contain pus, the third will contain more pus than the other two, usually.

Palpation over the suprapubic region elicits the facts that the bladder is tender and sensitive. Palpation of the rectum may show a normal prostate and vesicles, or there may be associated an inflammatory process of these organs.

The treatment of cystitis of gonorrheal origin



requires great care. The patient should be put to bed upon a liquid diet. The bowels should be thoroughly evacuated. Hot compresses over the suprapubic region may give relief. Local treatment is of the greatest importance. It must be remembered that instrumentation of an acutely inflamed urethra or bladder is absolutely not to be considered, as it will increase the virulence of the condition. Treatment of the bladder will be just as easy as treatment of the anteroposterior urethra, and consists of hand injections given by the surgeon of a quantity sufficiently large to completely fill the urethra and allow several cubic centimeters to run into the bladder, to be retained so long as the patient can comfortably do so.

The injection should be administered at least twice daily. Internally sodium benzoate, gr.x., three times daily will be of service. Treatment will usually be followed by good results, and the acute condition rapidly disappears with a clearing up of the symptoms.

No matter what treatment is instituted, the bladder condition frequently may not improve and will develop into a chronic type of inflammation.

The one great important feature with which we will conclude our discussion is: "When are we sure that a patient is cured of his gonorrhea and when is it safe for him to marry?"

These questions are not only important from the standpoint of the physician, but from the standpoint of the layman as well. These problems are brought to us daily by patients who have had past trouble and are anxious to marry. These patients are put through the regular routine examination. If there are lesions at any point in the urogenital tract which are productive of symptoms, or if there is pus found in the urine or in the shreds when they may be seen in the sample, we absolutely forbid the patient marrying.

We usually discharge a patient as cured when the urine is free from pus and bacteria and when there are no lesions to be found in the urogenital tract after repeated examinations. We always use the gonorrheal complement-fixation test. We feel that this test is as satisfactory for gonorrhea as the Wassermann is for syphilis. It is our usual practice to discharge patients when all pus and bacteria have disappeared and the comple-

ment fixation test is negative. *We give our consent to marriage when these conditions remain negative over a period of three months.* During this time the patient lives his ordinary method of life and is examined about three times. If we find negative results over this period, then we can feel sure that his marriage will be safe.

In conclusion we wish to state that we have endeavored to show that most complications and sequelae of gonorrhea are absolutely aborted in the vast majority of cases by the proper treatment of the acute type. If treatment is followed as outlined here the short duration of the attack and absence of complications will be particularly gratifying to both the patient and the surgeon.

1919 Prairie Ave., Chicago.

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### CYSTS OF THE PANCREAS\*

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By E. S. JUDD, M. D.

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Most investigators are agreed that true cysts of the pancreas originate in the substance of the gland and are formed where an obstruction to the outflow of pancreatic secretion causes a retention of the fluid and a dilatation of the ducts or acini. Although Opie and others have shown that ligation of the pancreatic ducts in man and in animals results in chronic inflammation with little or no dilatation they also uphold this theory and suggest that in the formation of the cysts the obstruction may be partial or that it may be intermittent. Pancreatic cysts are always associated with pancreatitis and some authors believe (Tilger) that their formation is the result of the inflammation scars form which may occlude the ducts. The shreds of pancreatic tissue often found in the cystic contents seem to support this view. However, since chronic pancreatitis is always present with cysts it is difficult to decide whether the inflammation has to do with the etiology or whether it is a result of the cysts. In support of the contention of Archibald that pancreatitis may be the result of bile entering the pancreatic duct and that these cysts are later the result of the pancreatitis, I have endeavored in several cases to obtain bile from the contents,

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\*Presented before the Minnesota State Medical Association, St. Paul, September 29-30 and October 1, 1920.

but so far I have failed. Archibald, I believe, did obtain bile from one pancreatic cyst. However, before it could rightly be assumed that the occurrence of bile in the pancreatic cyst means that the cyst has formed as a result of pancreatitis caused by bile entering the pancreatic duct it would be necessary to prove that there was no communication between the cyst cavity and one of the bile ducts. Injecting bile into the pancreatic duct in an animal sets up a definite pancreatitis, and I believe that many of the cases of chronic pancreatitis might be traced to the entrance of bile into the pancreatic duct; however, cysts form in the pancreas in a very small number of these cases.

A few pancreatic cysts are new growths or cystadenomas. These form much as do the cystadenomas of the thyroid and of the ovary and are papillary in-growths or adenomatous cysts. Korte collected thirteen of these cases. Fitz reported nine cases, eight occurring in women.

Cystic tumors of the pancreas rarely become malignant. We have observed two malignant cases. A few malignant papillary cystadenomas have been reported in which the malignancy had extended to the peritoneum, giving the appearance of nodules on the peritoneum found in similar tumors of the ovary.

Hydatid cysts have been found in the pancreas although they are rare in countries where these cysts are common in other portions of the body.

A few cases have been reported of congenital cystic disease of the pancreas with congenital cysts in the kidneys and liver. We have encountered this condition once in a patient past fifty years of age and in reasonably good health. In this patient the cysts were most numerous in the liver, although there were cysts in both kidneys and small ones in the pancreas. The cysts in the liver became large and were drained on two occasions about two years apart. Aside from this the patient was not inconvenienced.

Hemorrhage into the tissues of the pancreas occurs frequently and as a result cysts may form. The lining of the cyst sac in these cases probably does not have the usual layer of epithelial cells but a layer of connective tissue. That a cyst contains blood and is without an epithelial lining does not necessarily mean that

it formed following a hemorrhage, since frequently a retention cyst contains blood from a vessel that has ruptured because of a corroding effect of the pancreatic juice on the vessel wall, and since the epithelial lining also may have been destroyed by the influence of the pancreatic secretion.

The basis of this paper is a series of forty-one cases of cysts of the pancreas. This includes all the cases that I was able to find in the records of our clinic. In thirty-eight of the forty-one cases operation was performed for the cysts, and in three cases the cysts were discovered during an operation for some other condition. In many of the cases it was difficult for the operator to locate the cysts with relation to the surrounding structures and to determine whether they were true pancreatic cysts or so-called pseudocysts. The exact nature of the true cyst could not be determined in many cases as it was impossible to demonstrate obstruction to the ducts such as would cause retention cysts and since in most cases the destruction of the tissues within the cysts was so great that we could not know whether the tumors were cystadenomas or simple cysts. It seems to me that these distinctions will usually have to be made at necropsy. In only two of our cases were the tumors malignant or associated with malignancy of the pancreas. In one case we could not operate for the cyst because of a carcinoma of the stomach. There was one dermoid cyst. I was unable to find mention in the literature of dermoids in the pancreas, but there is no question that this cyst was a dermoid as it contained hair and one tooth and the operator felt certain that the cyst arose in the tissue in the body and tail of the pancreas. It was possible to remove the entire cyst and affect a cure. One true hemorrhagic cyst was found, although there was no history of trauma in this case; the condition appeared soon after confinement.

Trauma seems to play a definite part in the etiology of pancreatic cysts, according to Korte's report in about 28 per cent. Undoubtedly many of the resulting cysts are of the hemorrhagic type. In one case reported by Richardson a pancreatic duct had been torn by an external injury. The cyst usually appears soon after the injury although in some instances



it evidently develops slowly and does not make its appearance for several months. Trauma seemed to be an etiologic factor in only one case of our series; the cyst occurred two months after the injury and had been drained three times when we saw the patient.

The formation of pseudocysts, or false cysts of the pancreas is ascribed to the unusual action of the pancreatic fluid. They may form in the substance of the pancreas, a result of degeneration. Their walls are very thick and composed of fibrous tissue with no epithelial lining, which, however, does not distinguish this particular type of cyst. They present higher in the abdomen than the true cysts, and are not so closely attached to the pancreas, but in all cases in my experience the surrounding tissues were so densely matted that it was difficult to establish the relation to the approximating structures. According to Opie the formation and increase in size of the pseudocysts is due to the irritating products of the pancreas. Their formation has also been ascribed to a collection of fluid in the lesser peritoneal cavity.

The fluid contents of the pancreatic cyst may be light-colored and viscid, containing much mucin, although more often it is dark-colored from old blood or red from fresh blood. The fluid contains epithelial cells, fat, sometimes bile, crystals, blood cells, and necrotic tissue. One or more of the pancreatic enzymes are usually present and may be used as a distinguishing feature because if the fluid will coagulate egg-albumin or split starch it is probably pancreatic in origin. In most of the cases in which we have operated the contents of the cyst were very bloody, and usually as soon as any manipulation in the cyst is begun, bleeding is very free.

#### CLINICAL FEATURES

Pancreatic cysts may occur at any age, but they are most often seen in persons about middle life. Several cases have been reported in children a few months old and a few in persons more than 70. In our series the ages varied from 21 to 68. There were twenty-four females and seventeen males, the usual preponderance of females. The tumor presents as a rounded or oval semi-fluctuating mass at the umbilicus, in the midline just above it, or just to the left

of the midline. These cysts vary greatly in size. Some occupy almost the entire abdomen and pelvis and frequently in the larger cysts it is most difficult to distinguish the origin of the tumor, and the cyst is often so tense that it is impossible to obtain any fluctuation. It is usually fixed although when it arises near the tail of the pancreas it is movable and more to the left side. Rarely a cyst of the pancreas presents on the right side of the midline. As the cyst increases in size and extends forward it comes in contact with the anterior abdominal wall. In assuming this position, according to Korte, it most often crowds the stomach upward and the colon downward and presents between the two, behind the mesocolon. In several cases of our series the cyst arose high in the pancreas and as it extended forward, it presented above the stomach. In this position it tends to crowd the stomach downward and the liver upward. There is a third position in which the cyst extends forward between the layers of the transverse mesocolon, and the colon lies between the cyst and the abdominal wall or is crowded just above or just below the tumor (Figs. 1, 2, and 3).

The symptoms of the cyst usually are recorded as due to its pressure on adjoining organs. Pain is nearly always present, and in our series of cases was more pronounced than in most of those formerly reported. If the tumor becomes large it presses on the stomach, causing indigestion and vomiting. Some of our patients had severe seizures of vomiting which we attributed to an accompanying pancreatitis rather than to pressure. Pressure may be exerted on the diaphragm, colon, and bile ducts. Jaundice is not usually present in these cases. Loss of weight was considerable in many instances. Glycosuria and diabetes apparently follow after severe chronic pancreatitis. Osle collected 134 cases from the literature, only nine of which were associated with diabetes.

A review of the clinical histories in our forty-one cases shows that the syndrome varies greatly. The time of onset of the symptoms varied from three weeks to twenty-five years. I was much impressed with the frequency of associated gallbladder disease. Little mention has been made of this in former observations but of our forty-one cases gallstones were found

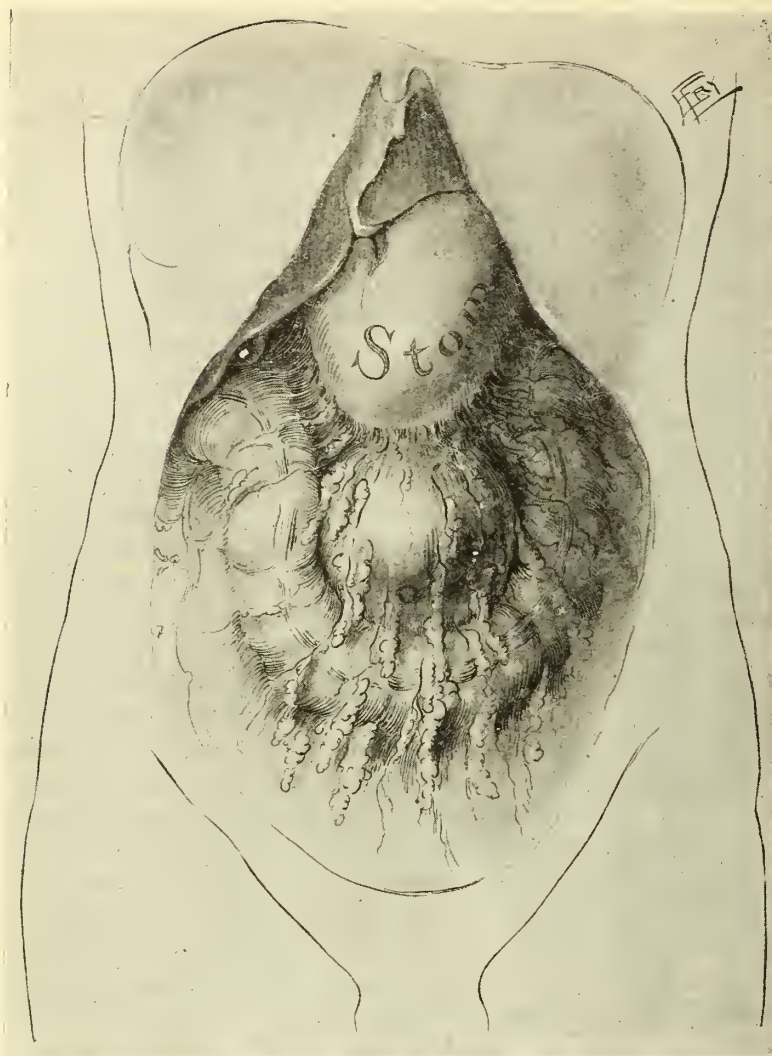


Fig. 1. Pancreatic cyst between the liver and the stomach, covered anteriorly by gastrohepatic omentum.

in twelve and a definite cholecystitis without stones in two others. In addition, in three cases operation for gallstones had been performed previously so that in seventeen of forty-one cases disease of the gallbladder was definite. This proportion seems to be large enough to warrant a consideration of a possible association between the two conditions.

Two of our patients had diabetes at the time of the operation for the cyst; both lived for about one year and then died in diabetic coma. One other patient developed diabetes after the operation. Four patients had sugar in the urine which cleared up on treatment.

The diagnosis is often doubtful and it may be necessary to postpone it until after an explora-

tion has been made. Mesenteric cyst, ovarian cyst, tumors of the kidney and spleen, and all forms of retroperitoneal tumors must be differentiated. Experience is probably the greatest aid and many of these tumors may be distinguished by their feel. The x-ray may be of great aid, especially in eliminating other lesions.

#### TREATMENT

Note much change has been made in the treatment of pancreatic cysts since operation was first performed for the condition. The ideal plan is to enucleate the cyst from the pancreas and its surrounding structures and to remove it entire, but because of its intimate attachment often this is not feasible. Bleeding is always pronounced and if too much of the pancreas is removed, diabetes may ensue. If the cyst is so situated, especially if in the tail of the gland, that removal is possible, that is the procedure of choice. More often it is advisable to open the cyst and drain the fluid after the wall has been sutured to the parietal peritoneum or after gauze packs

have been so placed as to protect the surrounding structures from the irritating and corroding fluid. If it can be done it is always best to suture the wall of the cyst to the parietal peritoneum. Following these procedures, the drainage is usually prolonged and often excessive and is apt to be very irritating to the surrounding tissues. Some wounds have been known to drain for several years before closing. When it is possible, a tube drain should be placed in the cyst cavity so that it will catch all of the fluid which can be drained into a receptacle without coming in contact with the tissues. The drainage of course continues until the mucous membrane lining has been destroyed completely. Attempts have been made to shorten the



drainage period by injecting irritating fluids into the cyst sac. This seems rather dangerous because of the possibility of inducing bleeding and destroying so much of the pancreas that diabetes develops. In some instances the cysts are multiple and two or more operations are required. In others the drainage tract may close before the cyst cavity has been destroyed and the cyst reform so that secondary drainage is necessary. It seems advisable whenever possible to strip out any mucous membrane lining of the cyst that can be removed without inducing much hemorrhage. I have done this in a number of cases in which it did not seem best to attempt to enucleate the entire cyst and I am of the impression that it has shortened the convalescence.

Drainage of the cyst cavity alone was performed in thirty-one of our cases, enucleation of the lining membrane in three cases, removal of the cyst entire in five cases, and no operation on the cyst in two cases. The results of the operations, considering the seriousness of the condition, have been very gratifying. The cyst should be removed if this is to be done safely. If it does not seem best to attempt removal, but if the mucous membrane is not too intimately attached to the surrounding tissues, it can be enucleated entirely or in part. Apparently the only point accomplished by the more radical procedures is shortening the convalescence. From our series I judge that those patients who had drainage only ultimately recovered completely as well as those from whom the cysts had been removed. In some cases the foul, watery irritating discharge from the cyst continues for a long time and causes much inconvenience and suffering, but eventually it stops. Most of the wounds drain for sev-

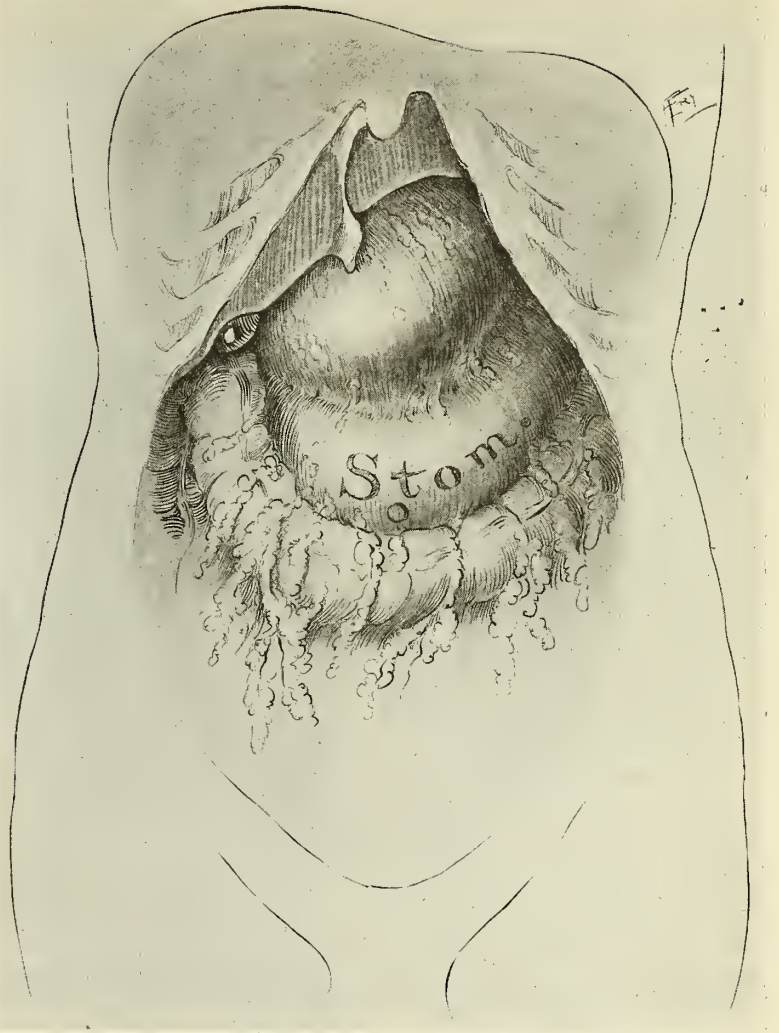


Fig. 2. Pancreatic cyst below the stomach, covered by transverse colon.

eral weeks, some for several months, and a few have been reported to have drained for years.

#### RESULTS OF TREATMENT

In our forty-one cases, there were no deaths from the operation. In many there was extensive fat necrosis, but apparently this is strictly a chemical change and not due to bacteria, as in no instance was there evidence of peritonitis.

One patient died a little more than one month following the operation and the necropsy showed a carcinoma of the pancreas and liver; the condition was, of course, discovered at the time of the operation. In one other case, carcinoma was found at the time of the operation and the patient lived for several months.

One patient died four weeks after operation and necropsy showed an acute nephritis. This patient was an alcoholic and was operated on in an emergency for dyspnea and pressure from the size and location of the pancreatic cyst. Nephritis was present at the time of the operation and became acute a few weeks later.

One woman had an acute hemorrhagic pancreatitis and multiple cysts. The cysts were drained but the severe pain and vomiting continued. Five weeks later an enterostomy was made for feeding, but shortly afterward the patient died. Necropsy showed hemorrhagic pancreatitis involving nearly the entire pancreas and marked fat necrosis and acute yellow atrophy of the liver.

In all of the other cases except the few recent ones in which drainage is still continuing all symptoms of the condition have abated entirely. Drainage of the cyst has apparently effected complete cure.

#### CONCLUSIONS

Cysts of the pancreas are not common, do not produce a definite syndrome, and are usually difficult to diagnose.

The association of gallbladder disease with cysts of the pancreas, found in seventeen of this series of forty-one cases, must have some etiologic significance.

Cysts of the pancreas are amenable to surgical procedure. While it may be best to remove them when possible, the results from drainage of the cystic contents are very satisfactory except for the rather prolonged convalescence.

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Fig. 3. Pancreatic cyst between the stomach and the colon, covered anteriorly by gastrocolic omentum.

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#### DISCUSSION

DR. ROBERT EARL, St. Paul: The Society is to be congratulated that Dr. Judd has presented this interesting and instructive paper on this unusual condition. Few surgeons have been able to accumulate an extensive experience with this disease or condition because of its rarity. My personal experience is



limited to one case which I saw about 14 years ago. It occurred in a woman, 40 years of age, who had complained of symptoms for two or three months. She presented herself with the chief complaints of pain and distress in the upper abdomen, with tumor swelling, weakness, and loss of weight. There was no history of injury or any special gastric or biliary disturbances. The tumor felt large and smooth, but it was practically impossible to say whether it was a solid tumor or a cyst during the examination. The late Dr. Lundholm, of St. Paul, saw the case in consultation and we were rather inclined to think we were dealing with some form of retroperitoneal tumor, though a pancreatic tumor was also considered. We advised exploratory laparotomy which was accepted by the patient.

On opening the abdomen we found we had to deal with a tense cyst with the stomach above and the transverse colon below. We packed off the tumor; introduced a trocar and drew off a reddish fluid, after which we opened and explored the inside of the cyst, which seemed to be definitely and decidedly attached to the pancreas. The question of enucleation and extirpation was considered inadvisable because of the firm adhesions, and we felt that the surgical risk would be too great. We drained with gauze and rubber tissue after attaching the edge of the sac to the parietal peritoneum. The fistula drained for about three months. The skin was red and inflamed and for a time we had considerable trouble keeping the patient comfortable. The fistula finally closed, and the last I heard from the patient, two years later, she was still well.

From the experience with one case, I feel that it would be well to emphasize a point which Dr. Judd brought out so emphatically in his paper, namely; in operation if extirpation of the cyst is possible, that is the operation of choice, but from the statistics of Dr. Judd's paper I should infer that there is only a small percentage of cases where it would be considered as safe a surgical procedure to extirpate the gland as to drain even though convalescence would be much prolonged. We must remember in dealing with extensive adhesions in the region of the pancreas that we are dealing with many important structures and many large blood vessels. A distortion of the splenic vessels might occur which would make the situation most difficult. Then, too, the separation of the extensive adhesions and the removal of the cyst in the upper abdomen is, of course, conducive to a great deal more shock than if we are doing the same kind of work in the lower abdomen.

Where the adhesions can be easily separated, this should be done and the cyst enucleated; where difficult separation, it is undoubtedly a safer procedure to simply drain the cyst.

DR. HARRY P. RITCHIE, St. Paul: In several years of active work associated with Dr. MacLaren, we have had only five of these cases. I do not think any one of them was diagnosed before the abdomen

was opened. One thing that has impressed me as most suggestive is the occurrence of a protrusion in the upper abdomen above the umbilicus and to the left of the midline. We found that a mass in such a position is the most reliable diagnostic sign of pancreatic tumor.

DR. A. T. MANN, Minneapolis: I think the interesting point is that of diagnosis. These tumors are more apt to be in the tail than in the head, though they can occur in any portion of the pancreas, and, of course, they are behind the peritoneum, so when they come up they push the peritoneum with them. The usual protrusion is between the stomach and transverse colon. In only very rare cases do they come up through the lower margins of the mesentery of the transverse colon and push the colon up to the abdominal wall and very rarely do they push down below that and present below the transverse colon. If they come a little higher and push up with a fairly low stomach through the space above the stomach, we have a protrusion slightly higher still, so that practically all the pancreatic cysts which we see and we do not see a great many of them—at least no one man sees a great many of them—occur in the space above the umbilicus. There are very few tumors which present in that upper left part of the abdomen, so that one should have a very strong feeling that he must rule out these pancreatic cysts when there is a tumor presenting in that space.

They tell a little story about Dr. J. Collins Warren who was professor of surgery at Harvard. They had a case in the Massachusetts General Hospital which every man who had seen it failed to diagnose. They decided to do an exploratory operation. The patient was prepared and they were already to make the incision when Dr. Warren walked through the doors. He saw the little swelling above the umbilicus and to the left of the midline and said, "I see you have a pancreatic cyst". They were all very much surprised because they had made a very thorough study in an attempt at differential diagnosis and had failed.

Pancreatic cysts as we find them usually are single and it is rather rare that a movable cyst is encountered. Some of them are traumatic in origin. One of the cases with which I had to deal was the result of trauma. This man was struck in the abdomen with a plank. About three weeks later he had a sore place there and he was slow in getting back to his work, but he went back. About three weeks later he began to complain of indefinite pains in the region of the upper left quadrant of the abdomen and at the end of three months he came to us. I found he had a cyst in the usual place between the stomach and transverse colon. In operating on these cysts if it presents between the stomach and transverse colon one has to cut through that portion of the omentum. Then there is beyond that a layer of peritoneum which one must go through before the cyst is arrived at. This man was drained. The discharge was blood stained at first but later

became clear. Two hundred and fifty cubic centimeters a day were discharged and a careful study showed enzymes of the pancreas. His sinus healed in eighteen months.

DR. R. E. FARR, Minneapolis: We have had one of these cases in the last year which presented no difficulty in diagnosis. The tumor was nearly as large as a basketball, surrounded by peritoneum.

My reason for taking part in the discussion was just to call attention to a little scheme, not new, I believe, but I want to emphasize it once more, of taking care of the skin. A rubber cement in ether painted upon the skin repeatedly will, in many instances, prevent irritation.

DR. ARNOLD SCHWYZER, St. Paul: I do not know that I can add much to the discussion of this paper. The diagnosis is not always so very difficult. When we have a patient coming into the office with a balloned epigastrium we might think there was a distention of the stomach, and we put a stomach tube down and find the swelling does not go down. We pump in a little air and we find that the air is above the dull area. We should then think of the pancreas or a filling of the lesser peritoneal cavity.

I remember a case very distinctly that was like the case mentioned by Dr. Mann. We could hardly mistake it. We had also two cases of cysts of the tail of the pancreas, which we went at extraperitoneally. Dr. Judd said sometimes he removes as much of the lining as he can. We did that too and in addition we swabbed out the balance with strong iodine, getting as much reduction of epithelium surface as possible. It is very good to close the wound tight afterward around a good sized rubber tube for drainage. Dr. Farr mentioned the rubber cement. About 20 years ago Doederlein came out with a rubber cement which he called Gaudanin and we used it. The discharge is reduced very much by a diabetes diet. I think that point is worth while.

DR. E. S. JUDD, Rochester (closing): Regarding the point Dr. Earl mentioned, drainage rather than removal; In reviewing the literature I found that emphasis was placed on removal of the cyst whenever possible. In my own cases it seemed to me that the results were just as good in those which were drained as in those in which the cyst was removed.

Dr. Ritchie brought out a point that I also mentioned, that the location of the cyst is probably the best point in the diagnosis. We have lately been able to diagnose most of the cysts. After a few of these cases have been seen they may be picked out by the feel. As Dr. Schwyzer mentioned, we were able to make a very fairly accurate diagnosis of most of the cases.

## ON ELECTROCARDIOGRAMS IN THYROTOXIC CONDITIONS

By GEORGE C. W. STEIN, M. D.  
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The electrocardiograms of cases of hyperthyroidism taken at the University of Minnesota in Minneapolis are usually of the so-called "arched type" in the second lead.<sup>1</sup> They show an arching of each cycle, concave downward from the beginning of the T wave to the end of the P wave.

Both Hoffmann<sup>2</sup> and Strubell<sup>3</sup> have pointed out that the T wave is exaggerated in hyperthyroidism much as after muscular exertion. According to Strubell, the P wave, too, is increased in height. Hoffmann thinks that the height of the T wave increases as the distance from the beginning of the Q or R wave to the end of the T wave is diminished, this change being an expression of the rapidity of the systolic contraction.

Figure 1 shows four characteristically arched hyperthyroid records in the second lead. In Table 1 measurements from the second lead of records of sixteen pronounced and fairly uncomplicated cases of hyperthyroidism are given. The height of the P, Q, R, S, and T waves is expressed in millimeters, one millivolt corresponding to ten millimeters, the usual calibration. The length of the P-R, R-S, and S-T interval is given in seconds. The P-R interval, representing the conduction time from the sinoauricular to the auriculo-ventricular node, is measured from the beginning of the P wave to the beginning of the R wave; the R-S interval is the distance from the beginning of the R wave to the end of the R wave, or of the S wave, when this is present; the S-T interval is the distance from the end of the R-S interval to the end of the T wave. Of six cases measurements from more than one record are given.

It will be observed that the P, R, and T waves are well developed, the first two averaging rather higher than, the third about as high as, the mean normal values as given by Lewis and Gilder.<sup>4</sup> These are 1.16, 10.32, and 2.46 millimeters for the P, R, and T waves respectively. In one case only is the P-R interval as





short as .12 sec., the lower limit of normal values. The upper limit, .18 sec., is reached more frequently and sometimes exceeded.<sup>5</sup> The R-S intervals are fairly normal. The S-T interval, which measures the length of the T wave, is mostly below the normal values of .30-.40 sec.<sup>6</sup> Electrocardiographic evidence of left ventricular hypertrophy is present in four cases, of right ventricular hypertrophy, in one case.

The arching of the ventricular complex seems to be due mainly to a shortening of each cycle by the tachycardia which causes the usually well-developed and sometimes exaggerated T and P waves to encroach upon each other and partly to merge, the galvanometer string not having sufficient time fully to return to the iso-electric position between them. The frequent occurrence of pronounced Q and S Waves and of shortening of the T wave further increases the "arched" appearance.

The effect of the over-riding of the P and T waves is illustrated in the first record of Case 7, (Fig. 2), in which short and long cycles occur as the frequency changes. In the short cycles the downstroke of the T wave and the upstroke of the P wave are both very short, the latter setting in very soon after the beginning of the former, cutting it short, as it were, and causing marked arching. In the long



Picture of six of the cretins: From left to right, back row, Case II and VIII; front row, Cases VII, V, VI, and I.

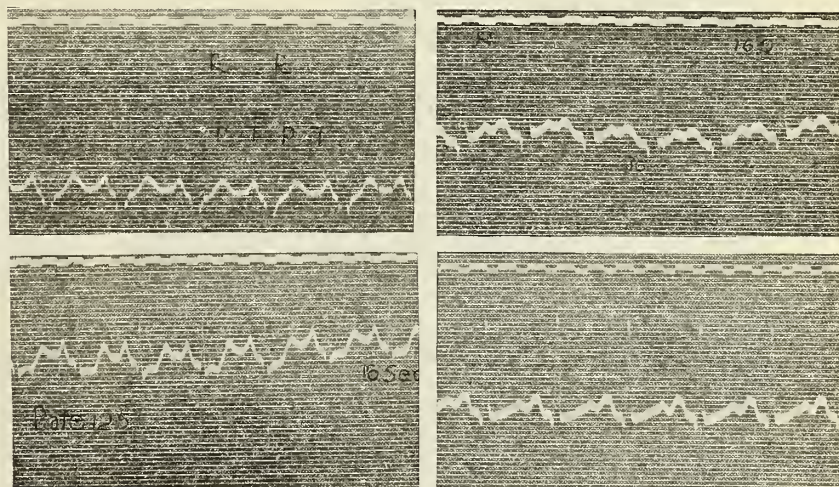


Fig. I

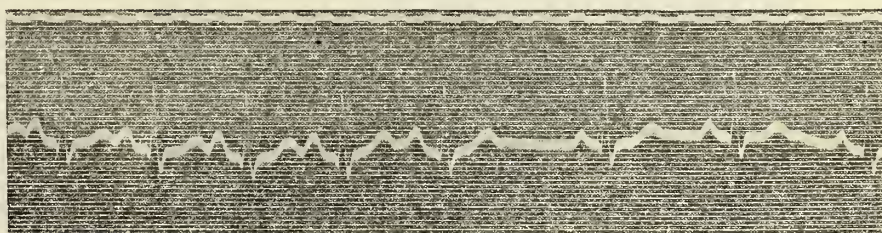
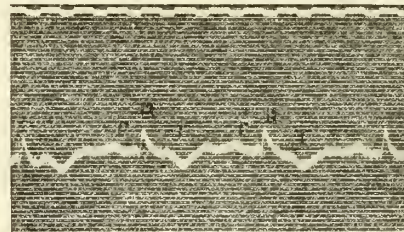
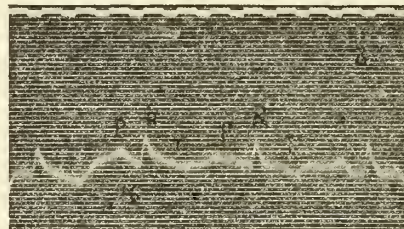
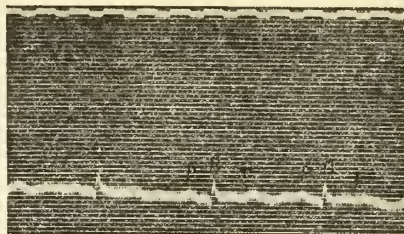


Fig. II



cycles, on the other hand, there is a long diastolic period of rest, the P. and T waves do not interfere with each other and there is, consequently, no arching. The S-T interval is about .30 sec., in the long and .23 sec., in the short cycles, while the conduction time is, oddly enough, longer in the short cycles than in the long ones. Other marks of distinction between the long and short cycles in this record are discernible in the shape of the P wave and the level of the straight line marking the diastolic period of rest. The crest of the P wave is rounded in the short, more pointed in the long, cycles. This appears to be an effect of the encroaching T wave. Furthermore, in the long cycles the diastolic period of rest is represented by a long straight horizontal line at a level with the short horizontal line directly following the P wave, both lying in the isoelectric position. In the short cycles this line disappears as the end of the T wave coincides with the beginning of the P wave. In the cycles of intermediate length the diastolic straight line is at a distinctly higher level than the line following the P wave. This phenomenon is of frequent oc-



Case 1

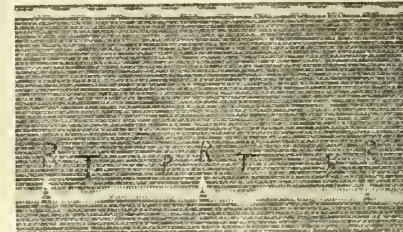
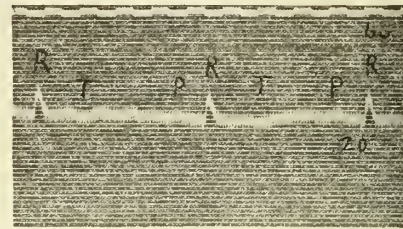
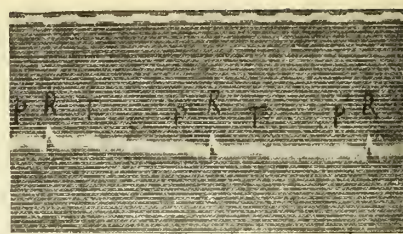


Fig. II

Case 2

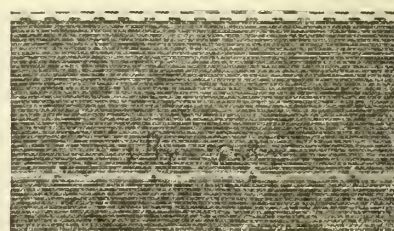
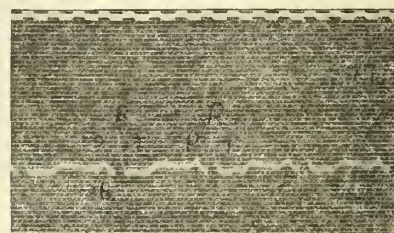
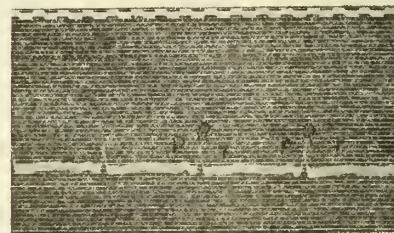
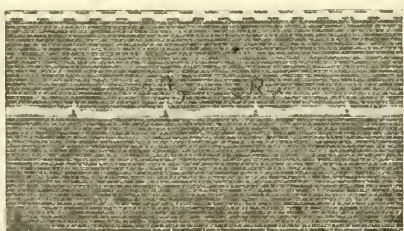
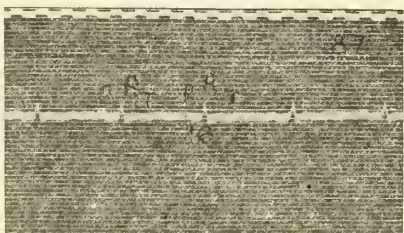
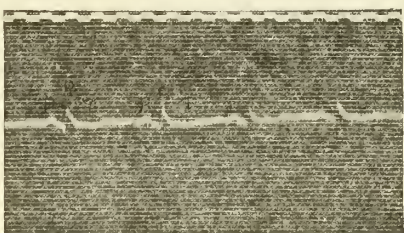


Fig. III—Case 1

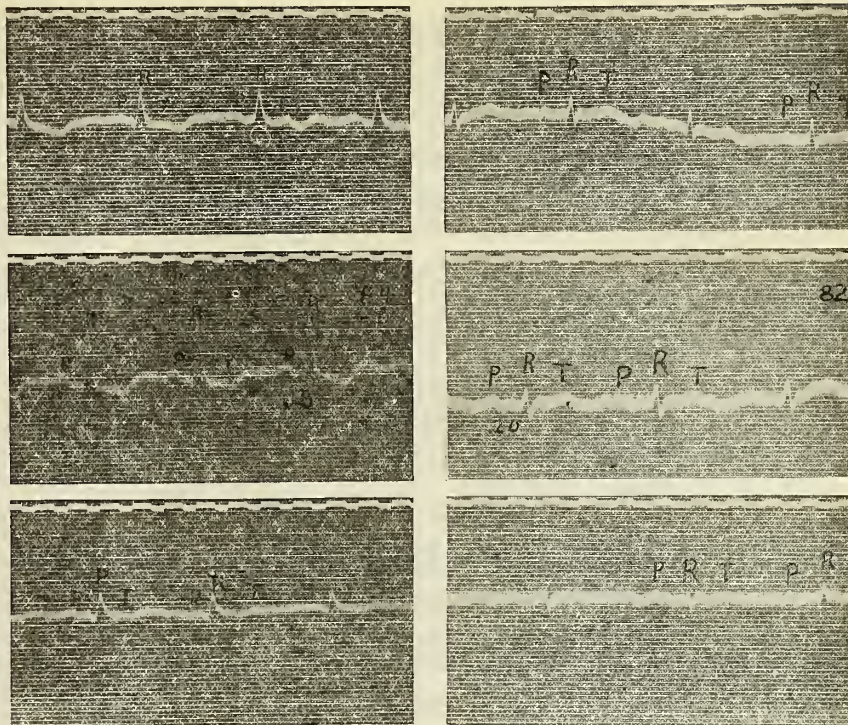


currence in cases with rapid heart action and suggests the possibility of a constant current resulting from simultaneous auricular and ventricular activity.

Records of the arched type are sometimes met with after muscular exercise and in febrile conditions, notably tuberculosis, whenever we have a simple tachycardia<sup>1</sup> with well-developed P and T waves.<sup>7</sup> There, too, the T wave is apt to be shortened. On the other hand, records of exophthalmic goiter have been published which show none of these features.<sup>8</sup> Complicating myocardial or valvular changes may, of course, modify the picture. Nevertheless, in the absence of considerable fever the arched type suggests hyperthyroidism and is of some diagnostic value.

These observations on hyperthyroidism led me to investigate the opposite condition, hypothyroidism. Electrocardiograms of cretins have not yet, to my knowledge, been made. Zondek<sup>9</sup> studied cases of myxedema and found that they always sooner or later develop considerable cardiac dilatation, usually, however, without or with only slight symptoms of decompensation. The characteristic diagnostic feature is, according to him, the disappearance of the P and T waves in the electrocardiogram and their reappearance coincident with improvement following the exhibition of iodothyrene.

Through the kind co-operation of Superintendent G. C. Hanna and Dr. W. A. Errickson of the Minnesota School for Feeble Minded at Faribault, I had the opportunity of having eight cretins electrocardiographed. All of these subsequently underwent a prolonged treatment with thyroxin, administered by mouth, after which four of them were again



Case 2

Fig. III

Case 3

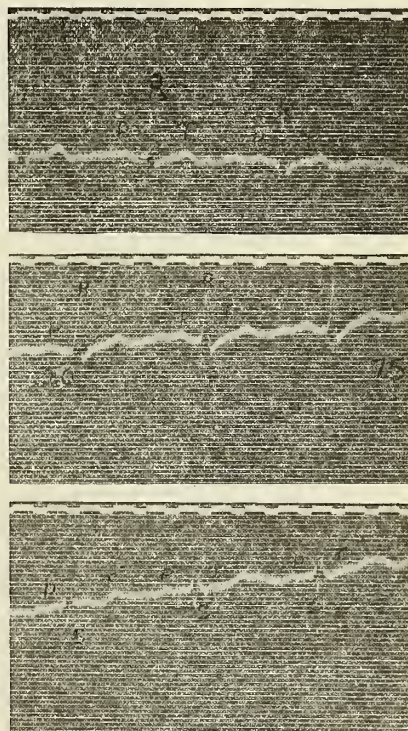


Fig. III

electrocardiographed. The patients' ages varied from 15 to 31 years, their mental ages as shown by tests taken by the department

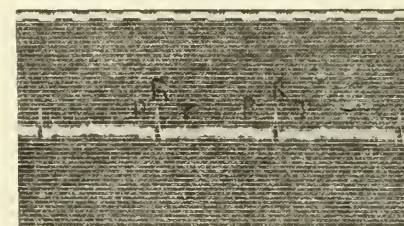
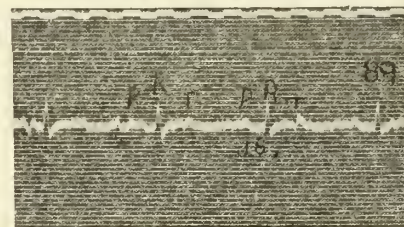
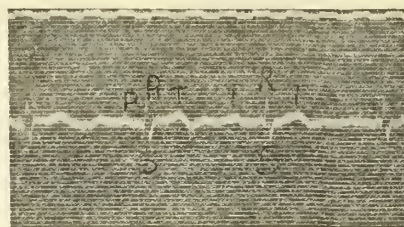


of psychology from 22 to 55 months. In all of them the somatic signs of cretinism were pronounced, excessively so in Cases 1, 4, and 7. No complicating illness was revealed by the clinical examination. Two Cases, 1 and 4, showed some clinical improvement following the administration of thyroxin.

The electrocardiograms taken before the treatment are shown in Figure 3, the four taken after the treatment, in Figure 4. In Table 2, measurements from Figure 3 in table 3, measurements from Figure 4, are given. Case 1 was eardiographed twice before beginning the treatment.

The eretins show a prevalence of low values for the height of the P, R, and T waves. Inversion of the T wave occurring in Cases 1 and 2 in the second, in Case 2 also in the first lead, may perhaps be regarded as an extreme reduction of the T wave which passes so to speak through zero into negative values. The average length of the S-T interval is within the above mentioned normal limits. No other anomaly seems to be distinctive.

It thus appears that whereas in hyperthyroidism the auricular and ventricular complexes are generally increased in height, they are diminished in height in hypothyroidism. This



Case 4

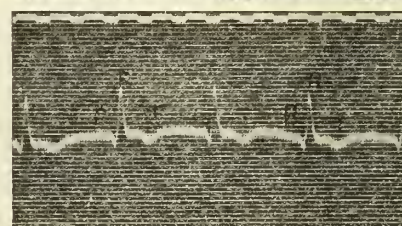
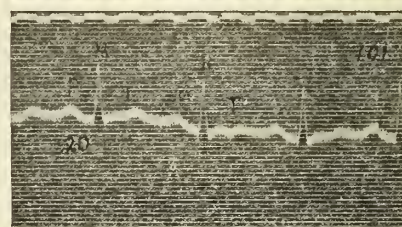
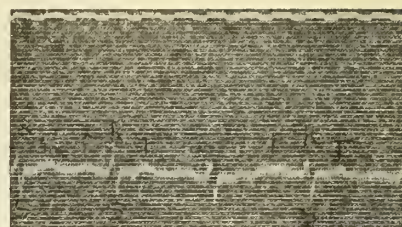
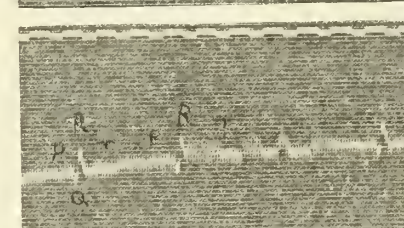
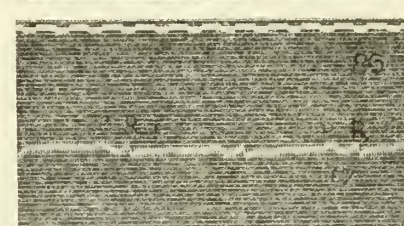
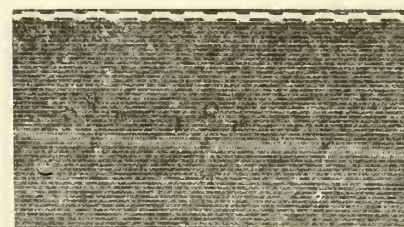


Fig. III

Case 5



Case 6

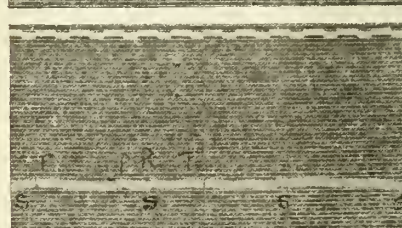
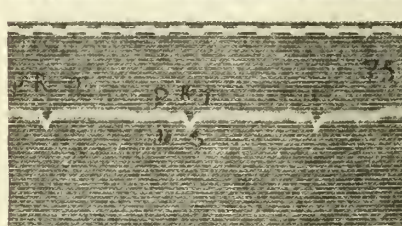
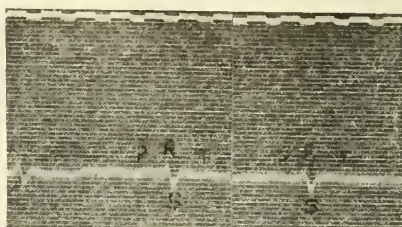


Fig. III

Case 7

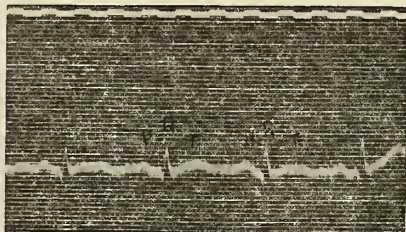
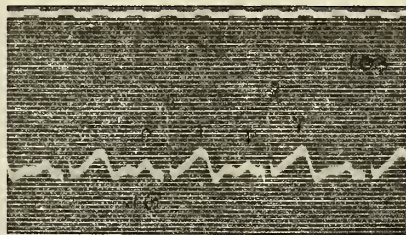
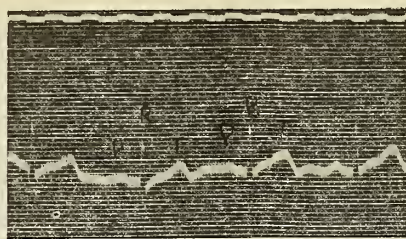
is, indeed, what might have been expected, the two conditions usually manifesting themselves as physiological antitheses. It is, furthermore,



evident that inversion of the T wave in the second lead occurs in cases of cretinism uncomplicated by other pathologic cardiac condition.<sup>10</sup> The T wave, short in hyperthyroidism, shows a normal average in the cretins examined.

The thyroxin medication did not produce uniform changes in the electrocardiograms. In Case 4 it is followed by an increase in the size of the auricular and ventricular complexes. In Cases 1, 2 and 7 the R wave is reduced in height. In Case 7 the complexes are exceedingly small and quite evanescent in the third derivation. The inversion of the T wave is less marked than it was before treatment in the second and third lead of Cases 1 and 2. It is, however, apparent now in the first lead of cases 1, where it was doubtful before.<sup>10</sup>

The administration of thyroid gland occasionally causes amelioration in scleroderma, a condition sometimes attributed to a thyroid dysfunction.<sup>11</sup> I, therefore, welcomed the opportunity of having two cases electrocardiographed. One of them, a young woman, patient of Dr. A. W. Hilger of St. Paul, developed a generalized scleroderma subsequently to an erysipelas of the head. About six months later she had made considerable spontaneous improvement. Her record was then taken and is shown in Figure 5. It is in no wise remarkable. The second case, also a generalized scleroderma in a young woman, was greatly benefited by intravenous injections of thyroxin. Her electrocardiograms, taken before treatment was begun and after improvement had set in, are shown in Figure 6. In the first record there is an inversion of the T wave in the second lead which, as in two of the cretins, is diminished subsequently to the exhibition of thyroxin.



Case 4

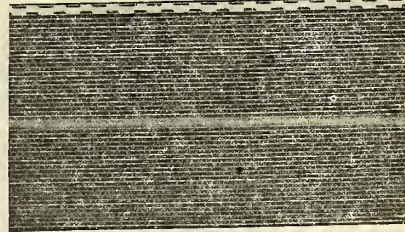
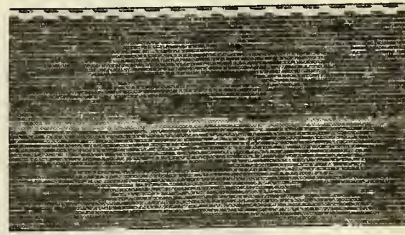


Fig. IV

Case 7

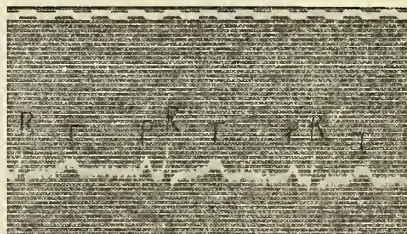
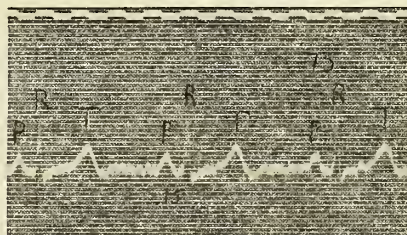


Fig. V

The conduction time is reduced from .20 to .18 sec. Auricular disturbances and occasional ventricular extrasystoles occur in both records.



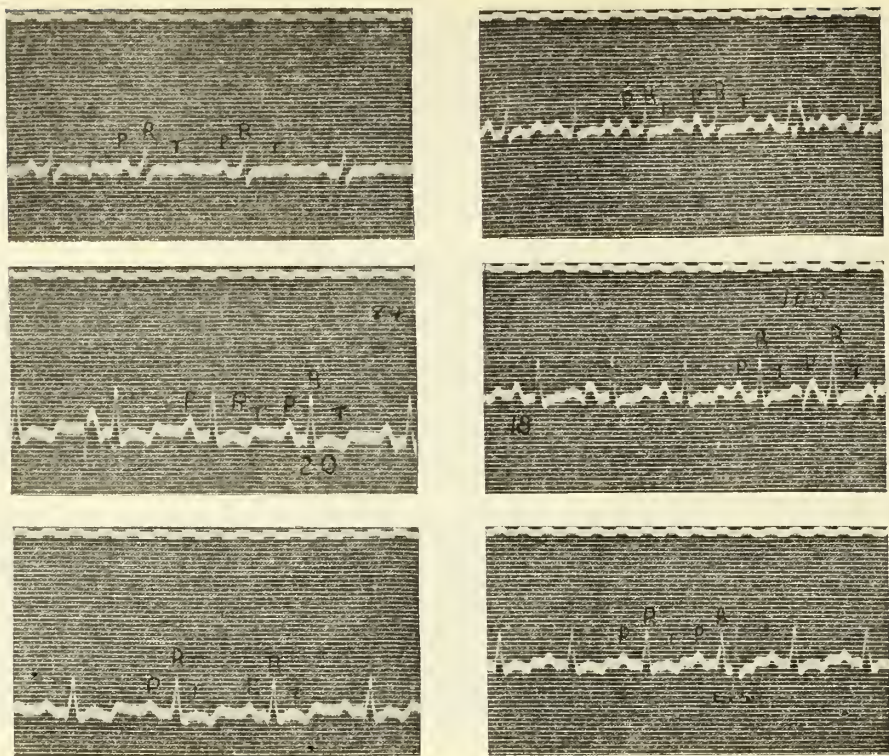


Fig. VI

The observations on which this paper is based were made in Dr. R. E. Morris' laboratory in Millard Hall. I wish to thank Dr. Morris for his invaluable aid in its preparation.

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TABLE I

| Case | E C<br>Hyper-<br>trophv | Pulse<br>rate | P   | Q    | R   | S      | T   | P-R | R-S | S-T |
|------|-------------------------|---------------|-----|------|-----|--------|-----|-----|-----|-----|
| I    | ....                    | 125           | 3.5 | 2.   | 19. | ....   | 2.7 | .17 | .05 | .27 |
| .... | ....                    | 100           | 2.  | 1.   | 15. | minute | 2.5 | .18 | .07 | .25 |
| II   | ....                    | 137           | 2.  | 1.   | 13. | ....   | 1.  | .17 | .07 | .20 |
| III  | Iet                     | 135           | 1.5 | .... | 10. | 2.     | 3.  | .17 | .07 | .22 |
| IV   | ..                      | 108           | 2.  | .... | 15. | 5.     | 2.5 | .16 | .09 | .24 |
| .... | ....                    | 84            | 1.5 | .... | 12. | 5.     | 1.8 | .15 | .09 | .28 |
| .... | ..                      | 144           | 2.  | 1.   | 13. | 2.5    | 2.2 | .17 | .07 | .18 |



TABLE I—(Continued)

| Case | E. C. Hyper-trophy | Pulse rate | P   | Q      | R   | S      | T   | P-R | R-S | S-T |
|------|--------------------|------------|-----|--------|-----|--------|-----|-----|-----|-----|
| V    | ....               | 132        | 3.3 | 3.     | 21. | 3.     | 3.5 | .12 | .08 | .19 |
| VI   | right              | 160        | 2.  | 2.5    | 16. | ....   | 2.5 | .16 | .06 | .16 |
| .... | ....               | 128        | 3.  | 1.5    | 23. | ....   | 2.5 | .18 | .07 | .22 |
| .... | ....               | 142        | 2.8 | 1.5    | 23. | ....   | 3.7 | .17 | .06 | .20 |
| VII  | ....               | 120        | 4.  | 2.     | 14. | 4.     | 3.  | .20 | .09 | .23 |
| .... | ....               | 85         | 2.5 | 1.     | 15. | 3.5    | 2.8 | .16 | .09 | .30 |
| .... | ....               | 99         | 2.  | minute | 13. | 2.     | 2.8 | .17 | .06 | .29 |
| VIII | ....               | 106        | 2.5 | minute | 8.  | 1.     | 1.  | .15 | .07 | .23 |
| .... | ....               | 110        | 4.5 | minute | 23. | 2.5    | 1.  | .19 | .11 | .20 |
| .... | ....               | 110        | 3.  | ....   | 18. | 3.     | 1.  | .20 | .11 | .20 |
| IX   | left               | 86         | 1.  | ....   | 4.  | minute | 1.3 | .13 | .04 | .30 |
| X    | ....               | 101        | 2.5 | 1.5    | 15. | 4.     | 3.  | .17 | .09 | .25 |
| XI   | ....               | 134        | 1.  | 2.5    | 7.  | 1.     | 2.  | .16 | .04 | .20 |
| .... | ....               | 134        | 2.  | 2.     | 13. | minute | 1.5 | .16 | .05 | .22 |
| .... | ....               | 116        | 1.7 | 2.     | 13. | 1.     | 1.  | .15 | .05 | .23 |
| .... | ....               | 119        | 1.5 | 2.     | 13. | ....   | 1.5 | .19 | .05 | .23 |
| .... | ....               | 117        | 1.5 | 2.     | 14. | 2.     | 1.5 | .19 | .04 | .20 |
| .... | ....               | 123        | 2.  | 2.     | 14. | ....   | 2.5 | .15 | .06 | .20 |
| XII  | left               | 125        | 4.  | 1.5    | 8.  | 2.5    | 3.  | .16 | .03 | .25 |
| XIII | left               | 120        | 4.  | ....   | 13. | 4.5    | 2.5 | .16 | .06 | .28 |
| XIV  | ....               | 115        | 3.  | 1.     | 32. | ....   | 2.5 | .15 | .1  | .28 |
| XV   | ....               | 95         | 2.5 | ....   | 15. | 2.     | 3.5 | .17 | .07 | .29 |
| XVI  | ....               | 118        | 4.  | 1.5    | 19. | 3.     | 4.  | .18 | .08 | .22 |

TABLE II

| Case | Sex | Age | Mental age in months | E. C. Hyper-trophy | Pulse rate | P      | Q    | R      | S    | T        | P-R | R-S | S-T  |
|------|-----|-----|----------------------|--------------------|------------|--------|------|--------|------|----------|-----|-----|------|
| I    | †   | 31  | 55                   | ....               | 83         | 2.5    | .... | 6.     | .... | inverted | .16 | .08 | .32  |
|      | †   | 31  | 55                   | ....               | 65         | minute | .... | 6.     | .... | inverted | .20 | .07 | .36  |
| II   | †   | 24  | 48                   | ....               | 84         | 1.5    | .... | 11.    | .... | inverted | .18 | .08 | .30  |
| III  | †   | 27  | 42                   | ....               | 82         | minute | .... | 3.     | 2.5  | 1.       | .20 | .05 | .40  |
| IV   | †   | 31  | 22                   | ....               | 89         | minute | .... | 5.     | 1.5  | minute   | .16 | .06 | .35  |
| V    | †   | 15  | 32                   | right              | 101        | 2.5    | .... | 11.    | .... | 2.       | .20 | .06 | .29  |
| VI   | †   | 25  | 32                   | ....               | 86         | minute | .... | minute | 2.   | minute   | .17 | .09 | .30  |
| VII  | †   | 22  | 54                   | ....               | 75         | minute | .... | minute | 2.5  | minute   | .18 | .06 | .... |
| VIII | †   | 15  | 44                   | left               | 75         | 1.5    | .... | 9.     | 1.5  | 1.5      | .20 | .07 | .28  |

†—Male.

‡—Female.

TABLE III

| Case | Pulse rate | P      | Q    | R      | S      | T        | P-R  | R-S  | S-T  |
|------|------------|--------|------|--------|--------|----------|------|------|------|
| I    | 87         | minute | .... | 2.     | minute | inverted | . 16 | . 05 | . 27 |
| II   | 77         | 1. 5   | .... | 8.     | ....   | inverted | . 16 | . 07 | . 39 |
| IV   | 103        | 2.     | .... | 11.    | ....   | 5.       | . 16 | . 04 | . 30 |
| VII  | 70         | minute | .... | minute | 1.     | ....     | . 15 | . 11 | .... |

THE ORGANIZATION OF MEDICAL  
SCHOOLS AND HOSPITAL FACILI-  
TIES FOR GRADUATE MEDICAL  
EDUCATION\*

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Dean, University of Minnesota, Medical School,  
*Minneapolis, Minn.*

You will note from the original program that a paper on this subject was to have been presented by Dr. Louis B. Wilson, of Rochester, and that I was to discuss it. As he cannot be here, I have been asked to present his subject. I have no formal paper. In the few minutes allotted to me I shall discuss three topics, the first two of which pertain to graduate medical education directly. The last concerns our state university medical school, and therefore concerns graduate work indirectly.

It is evident that two types of post-degree work need to be carried on. The first of these is the type of education needed to make medical specialists in the real sense of that term. Such a course, as you all know, does not consist of three weeks or three months. It is a matter of years; nobody knows how many; but surely, three or more years under good auspices must be put in by the medical graduate before he can be a competent surgeon, or a competent internist.

The University of Minnesota has instituted a plan of instruction for medical specialists under the same organization and ideals as those which are used in the universities all over the world for the production of specialists in other fields of human endeavor. The chemist, the historian, the expert in agriculture, and so on, are all graduated under the system which I shall describe. Our idea is that medical specialists can be taught in the same way; and what we call

the Minnesota plan is merely the application of the ideals of the graduate school to medical education.

There are four or five points which are common to this type of education everywhere. There is first the machinery or organization under which it is accomplished. The graduate school is not a school of buildings and classes in the ordinary sense, as people are accustomed to think of a school. It is rather a faculty of teachers; and its organization is superposed, as we might say, on the other schools and colleges. Just as you belong to the county society, to this society, and to the state society, so there are in the university men belonging to various faculties. From these groups of university men in all the fields of learning, those who are best qualified to teach advanced work are picked out and belong also to the graduate faculty. The graduate school is therefore, not a school of buildings or laboratories, but is rather a faculty and a group of advanced students. I am not dean of that faculty; the professor of history happens to be.

Secondly, graduate education in all branches is informal. Of course, you all know real education is individual, and that a man educates himself. You are here in this meeting really for the purpose of continuing your education. So it is in the graduate school,—each man educates himself with the help of those who are expert in the line he wishes to pursue. Each man has an adviser under whom he works and who lays out a program for him. That is the way we do, both at Minneapolis and Rochester.

In the third place, a man having decided upon his main branch must prepare himself, also, along allied lines or else he is not a true specialist. He must know those facts and methods which are the foundation of his work. We have him choose his "major" and "minor" subjects. Then we have a program laid out which

\*Address given before the Southern Minnesota Medical Association, Fairmont, Minn., June, 1920.



involves the necessary foundation sciences for his specialty.

If he is going into internal medicine, he goes back to physiology; back to chemistry. If it is surgery, he takes up anatomy, pathology, and so forth. You all know when you come to think of it that in the ordinary four year medical course you got only the elements of these laboratory branches. Therefore our plan involves a more thorough knowledge of particular sciences that one needs.

It is of course essential that a man have also a thorough clinical knowledge of his specialty. We try to see to it that the specialist is well trained clinically. We feel however, that a person going into any given specialty is bound to be with that all of his life time, whereas only for a limited time will he have access to good laboratory facilities.

We feel, fourthly, that a man must be acquainted with the literature of his specialty, and hence we have requirements of language tests. We feel that a specialist should be a contributor to his specialty and should know the methods of research. Therefore the requirement of a thesis. And finally there are comprehensive examinations that will test a man and show that he is qualified for an advanced degree which is merely the sign of qualification of a specialist, from the university as a standardizing agency.

This, in brief, is exactly the way an historian is produced; that a chemist is produced; and that an expert in soils is produced. This is the Minnesota plan of graduate medical education which is in vogue in connection with our hospitals at Minneapolis, with our laboratories and with the Mayo Foundation. The latter, you understand is not a part of the medical school, but is a part of the graduate school of the university.

It is a source of great pride to us, (and I think many of the practitioners of the state share with us in this feeling), that we have the largest, strictly graduate school of medicine in the world. We have about 200 students in the two places.

You will note if you stop to think of it, that our plan is really nothing new. It is what has been done before, with one exception. The

exception is very important, and I shall try to make it clear.

Dr. Wilson as chairman of a committee on graduate medical instruction, appointed by the Council on Medical Education of the American Medical Association, investigated how men become surgeons, urologists, eye and ear men, and so forth. He found, taking the good ones, that the chief method that has been used in the past and that is in use now, is that they should serve as "assistants" in a good clinic for two, three or more years. The doctor calls his helpers "assistants"; but from the young men's standpoint, they serve their assistantship for the purpose of becoming efficient in the specialty. Now our idea is that those young men be looked upon as students and not as hired men. If you go to the Mayo Clinic or the University Hospital you will see young men working there. They will look to you like assistants, and they are assistants; but we take a different point of view regarding them. We say they are not the servants of the clinic, but primarily students. We call them "fellows." As soon as you make that slight transition in regard to your assistant, you have made a great difference in your attitude toward him and in his attitude toward his work. You lay out a man's program not with reference, primarily, to how he can best help you, nor how he can best contribute to the efficiency of the hospital or clinic, but how you can best help him. As an outsider, (because I am a physiologist and not engaged in clinical medicine), I have been surprised to see the difference in the attitude of our men, both at Rochester and at Minneapolis, as soon as they began to regard the young doctors as students primarily and ceased to regard them as assistants primarily. You would hesitate to send an assistant perhaps to the anatomical or pathological laboratory for three or six months and pay his salary; but we do not have any hesitancy in sending these men, if that is what they need.

As I have tried to analyze the situation in my mind, I have become more and more persuaded that the essential point in the Minnesota plan is the taking of the assistantship and making it a graduate studentship, and considering the obligations of the institution toward these men along that line. You can see how this may

affect the organization of hospitals and may be extended to hospitals not immediately connected with medical schools.

I hope I have conveyed to you clearly what our main idea is in the graduate medical school of the University of Minnesota. As I have said, it is exactly the same idea applied in regard to medicine that for years has been applied successfully to the natural sciences and social sciences, and to languages and literature. That is the first topic I had in view.

A second thing I want to speak of is the type of education, which is apparently needed by ordinary practitioners in the form of review courses or short advanced courses by which in the short time which they can spare from practice they can gain information and make themselves more proficient along some line or master some new technic. That is what so-called post graduate schools attempt to do. Dr. Wilson if he were here could give you definite information on this subject, as he has visited these schools all over the country. But that, in the main, is what they attempt to do. None of them, I believe, has mapped out anything like a complete course to fit men for a specialty, although they may give a part of it.

This second type of education is a difficult thing to organize, and I do not think it has been done satisfactorily in this country. If you attempt to do it in a medical school of the undergraduate type you meet with great difficulty. At Minneapolis, for example, we have a faculty and certain clinical facilities; and both are occupied in taking care of a large body of undergraduate students in a definitely laid out four year course. To separate certain parts of this instruction and organize short intensive courses, such as are needed by practitioners who can only spend three or four weeks in study, would upset the whole curriculum. We have not been able to do it. Our faculty is too small and our facilities are too limited. Although I recognize the need, I do not see how it can be met,—I mean adequately, from an educational standpoint.

In my opinion, what is needed for practitioners is a large, independent endowment and a special faculty in connection with ample facilities in large hospitals which are not used for undergraduate instruction.

If you want to go and get a definite course in clinical pathology or cystoscopy or some other branch four or six weeks, somebody must be paid to give it. The fees you can pay are insufficient; just as the tuition you paid as undergraduates was insufficient to supply good instructors. State aid or endowment was needed.

You do not wish moreover to sit on a bench and hear lectures. You want to do the actual work under strict supervision. Certain men will have to give a large amount of their time to this form of teaching, and it does not appear that the thing will be done right until we have special organizations for it is in connection with clinical facilities not used for undergraduate teaching in the large cities.

While therefore we cannot organize post-graduate work at Minnesota, as some of you knew it in Berlin and Vienna, we will do all we can for you; and perhaps there is more up at Minneapolis than you know. All of our lectures, clinics, dispensary work, laboratory courses, and so on, are freely open to any practitioner who wants to come there for a few days or weeks as a visitor. If he wants to stay a longer time he can do so as a special student. There are special laboratories of animal surgery and experimental medicine, and we have full time men in charge of them. The same is true of the anatomical, bacteriological, pathological and physiological laboratories. They are well equipped, and we have good men in charge. You will find they will give you any assistance in their power.

The "Physicians' Days" of special clinics which were discontinued on account of the war may not be resumed, because the Minneapolis members of our faculty will cooperate in the "Clinic Week" of Hennepin County, which places all the clinical facilities of Minneapolis at the disposal of visiting doctors. Our university clinicians in St. Paul likewise will take part in the "Clinic Week" of that city. However, I want you to know we have your needs in mind; and as far as we can, consistently with our obligation to our undergraduate body, we will use our facilities and our institutional forces to meet the needs of the medical profession.

You have here today a body of influential medical men of the state; and I want thirdly,



to say a word to you about the medical school of the state university. I venture to say that you all believe that the medical school ought to be ample for the needs of the state as an undergraduate institution; and I presume most of you take the position that it should be ample for the needs of the state as a graduate institution as well. Most of you would go a step farther, on account of its strategic situation geographically (with no school between Minneapolis and the western coast), and say that our school ought to be ample for the needs of the great northwest. The question is, can it meet these needs?

It is a good school. We have no need to be ashamed of it. I am going to give you some information which I got in a round about way from the dean of another school. He wrote letters to about twenty-five of the leading medical educators, asking them to give their opinion as to the twelve leading schools of the country. The last time I saw him he had received 18 replies, and Minnesota was on every list except one. Therefore you see a large number of men who are posted on medical education believe we have a good school in this state.

But that ought not to make us self-satisfied and complaisant. We all see there are ways in which the school can be improved. Every department should be strengthened, but the place where we are the weakest is on the hospital side. Ever since I have been here, now seven years, we have been working and working, and not a single thing has been added to the hospital in that time except a service building, which was constructed soon after I came. We need 500 or 600 beds instead of 200. I think you will all agree with that proposition abstractly. It is in regard to how to get them and how to run them that questions arise.

We have a great many problems; but I will touch on only one of them, that of clinical personnel. If we wanted an anatomist tomorrow, everybody here would say, go and get the best man that can be found anywhere in the world and have him give his whole efforts to teaching that subject. You would not wish to have him practice medicine one-half or three-quarters or ninety per cent of his time. You would say, pay him sufficient salary so that he may devote his whole time to anatomy. It is the same with

regard to pathology, pharmacology, physiology and bacteriology.

When we come to the clinical departments we meet with great difficulty and difference of opinion; that is, how to select men, what type to get, what arrangements can be made with them. I do not know where we are going to arrive; but I am frank to say to you that this problem is the hardest one in medical education to solve, and I bespeak your thoughtful, careful, friendly consideration of it.

Shall the teacher of surgery, medicine, or obstetrics devote his whole time to research and teaching, and not practice at all? Some people advocate this. There are two reasons why our university cannot do it. First, we have not adequate hospital facilities to attract such men, and the second is we cannot command salaries large enough.

But I for one do not believe in that plan. I think our clinical teachers ought to have an intimate relation with medical practice in some form or other. But how?

In the old days medical colleges picked out a local practitioner, who was best known in his line, who had the best reputation or biggest practice and made him professor of medicine or professor of surgery. But it was found there were distinct limitations in educational efficiency connected with this method.

When a man even with the best intentions devotes part of his time to teaching and the other part to practicing medicine, there must be occasions in which he must put the work of attending to his patients first, because he has assumed a vital responsibility toward them. Moreover the natural tendency always is to take more practice as it comes, and this seriously hampers a teacher's work in connection with the university. Some men, furthermore, are not entirely conscientious in regard to their school obligations. Finally the busy practitioner is seldom an investigator of authority; nor as a rule can a man who has gained fame in medical research retain his standing in that regard if he begins on an active outside practice.

In spite of all these drawbacks, I advocate some kind of arrangement by which the clinical professor may maintain relationship with the medical profession,—an arrangement which shall make him really part of the profession.

It must be an arrangement which makes the educational side truly **vocational**, and which makes practice merely secondary or avocational rather than the man's primary work. For instance, a man in Dr. Rowntree's place as chief of the department of medicine, ought to be primarily a teacher and investigator. His relation to the outside ought to be secondary.

Let me repeat, medical education in the clinical departments is between the devil and the deep sea. On the one side is the part-time instructor who is primarily a practitioner and only secondarily a teacher. On the other side is the cloistered scientist with no knowledge of practice and no common bond with the medical profession. We should, *we must indeed*, avoid both these extremes.

The plan which I believe is the best is what I have called the geographical full-time plan. A man in medicine or in surgery or in any of the main clinical departments in a university should do all of his work *in one place* and under one organization and one administration. That again may strike some of you as being impossible of accomplishment because it involves so many things which you think a state school should not do. I hope to show you that such is not the case.

If our teachers do all of their work in one place, it means the university hospital has got to have three classes of patients; firstly, those who do not pay at all; secondly, patients who pay for their bed and board, the so-called per diem patients; and thirdly, we must have those who pay for their professional care also.

You are all doubtless willing that the medical school should care for the pauper sick of the state. You would like to see the university charity hospital enlarged, but there we strike the legislature. They are not willing to go any further in the matter of a free hospital. Moreover, the Board of Regents are not willing to use university funds to any greater extent for the support of free beds.

Many of you would probably be willing that we take the second class or per diem patients. You hesitate in regard to pay patients. That is where our conference with a group of Twin City doctors came to the point of opposition. They were perfectly willing that the university hospital should have free patients; and every one, except perhaps one or two, said he was willing that

the university should take a class of patients paying for their bed and board. They were willing finally that our professors should have a hospital across the street for private patients, but they were not willing to have pay patients on the campus of the university.

We ought to work out this problem together; and I want to point out, from my standpoint as a physiologist, that I should very much dislike to have one laboratory on the campus, another across the street and another perhaps over town. With such an arrangement I could not do my work satisfactorily. Geographical unity is very essential to my department of physiology, and I believe it is equally essential to the department of medicine, or to the department of surgery.

There are excellent reasons from the educational side why we should have all types of patients. From the financial side it is indispensable, as in no other way can we support the best type of clinical teachers. In no other way can we make them university men in the fullest sense and at the same time active members of the medical profession.

We will best conserve the medical school and best conserve you as a profession if you can bring yourselves to the point where you are willing to assent to the principle of geographical full time and not be upset by its minor implications.

Under this plan, all patients would be under the university roof and under one organization. All fees and charges would go to the hospital. There would be better opportunity and facilities for interns and nurses and graduate students and for the active profession. It is the plan in use in Michigan and just adopted in Wisconsin, and nearly like that used in Iowa.

Competition under this plan would surely be less than if the clinical teachers with university prestige have offices in town and the right to consult all over the state. The only argument you have to fall back on is that of public policy. Are you ready to say that the university should have no relation to the practical affairs of life? That it should go back to the cloistered seclusion of the middle ages? I cannot believe that the intelligent medical profession of Minnesota is willing to take such a position.

I believe that the geographical full-time plan is the solution of the university medical problem.



I bespeak your careful study of it, and trust and believe that you will give your assent to it when the time shall come.

#### DISCUSSION

DR. WILLIAM F. BRAASCH, Rochester: After listening to the clear cut frank discussion of the subject of graduate and undergraduate medical education in the University of Minnesota and after hearing his plea for the united support of the medical school by the physicians of the state I wish to apologize for my presence.

I am, however, going to read a few excerpts from a paper which Dr. Wilson wrote concerning graduate education at the Mayo foundation. In this paper Dr. Wilson has described the general plan of medical education that is followed at Rochester. He, together with Dean Lyon and others of the University of Minnesota deserve great credit for its development. Being a member of the committee of the graduate school, this question is frequently asked me by physicians: "What form of medical education do you give at Rochester and who are available for this education?" In answer to this the following data may be of some value.

In regard to the divisions of the men who are taking the various courses at Rochester, we have now a total of 142 fellows there. The largest number, 86 are majoring in surgery, 22 in medicine, and we are rapidly increasing the number of men who are majoring in medicine; nose and throat, 12; urology, 5; dental surgery, 4; orthopedic surgery, 3; laryngology, 3; dermatology, 4; pathology, chemistry, bacteriology, one each, or a total of 142 fellows enrolled at Rochester.

It may be of interest for you to know where these men came from. Of the number 22 came from the University of Pennsylvania; 18 from the University of Minnesota; Rush Medical College, 14; Michigan, 8; John Hopkins, Maryland, Toronto, Harvard, Vanderbilt, Iowa, five each; Washington University, Creighton, and the London Medical College of Canada, 3 each, and the rest, namely, Georgia, Washington, Syracuse, Western Reserve, Jefferson—in fact practically all of the Class A medical colleges are represented together with several foreign universities, so that the number taking the various courses is widely scattered throughout the United States and Canada.

We are pleased to note that we have the second largest group from the University of Minnesota, and while we encourage applicants from the University of Minnesota, nevertheless only a small proportion are selected from that school.

It is easy to see what this will lead to, when one considers that forty of fifty men who have taken

these courses will graduate every year. These men will unquestionably be better equipped and fitted in every way to practice a specialty than the average practitioner without such preparation. In the course of years, one can readily see what a powerful influence for good these men will have upon the medical profession throughout the United States and in this way we hope that the Mayo foundation will justify its existence.

DR. WALTER H. VALENTINE, Tracy: I graduated from the University of Minnesota twenty years ago. I am in favor of postgraduate medicine, and I am also in favor of special training for those who wish to become specialists, but I do not think a six weeks course in attending operations will make a specialist. I feel that the general practitioner has been overlooked by the University of Minnesota, because they have the facilities there for teaching things we do not know. A great many of us graduated at a time when clinical facilities amounted to absolutely nothing. I saw one obstetrical case before I received my diploma, and I think my experience is no different from that of other men who have graduated from there.

I do not wish to criticize, but I would simply state that when we practitioners send a patient to the university hospital we are asked to give a tentative diagnosis. When that patient is taken care of, the man who sent him there knows nothing as to whether the diagnosis was made correctly or not. He knows nothing of the treatment given the patient, and the patient is sent home sometimes wondering whether the local physician knew what was the matter with him. We should be informed as to the exact findings, and if we are correct in our diagnosis it should be verified. If we are incorrect in our diagnosis, we should be jacked up and told how to make a diagnosis.

While Dr. Rowntree very kindly told me sometime ago that he would be glad to aid any of us in any special work we desired, I do not believe there is a man here who has ever heard that publicly announced on the platform until today.

We have no records of what the university hospital is doing; they are not given to the general practitioner the way they should be. The least the University of Minnesota can do for the country doctor or the general practitioner is to issue a regular bulletin of what is being done, what is being investigated, and what is up to date, and put this bulletin into the hands of every practitioner in the state.

I feel the medical profession of the state of Minnesota is very greatly indebted to the Hennepin County Medical Society for the clinic they give each spring which is really the duty of the state university. (Applause.)



## TREATMENT OF EARLY PULMONARY TUBERCULOSIS\*

WALTER J. MARCLEY, B. L., M. D.  
*Minneapolis, Minn.*

At the outset let us recall that infection in tuberculosis usually takes place long before clinical disease manifests itself, that the large percentage of small healed tuberculous lesions found by the pathologists post mortem in individuals past middle life teaches us not only the almost universal existence of tuberculous disease in the tissues of the body, but also gives us a reasonable basis for hopefulness in beginning treatment of the clinical condition; that the substances described as antibodies to whose presence it is assumed is due the specific response in tuberculosis are considered to be cellular, and although the fact is not demonstrable it is probable that many if not all the tissues in the body are altered by tuberculous infection by the manufacture of these anti-bodies. Undoubtedly the post-mortem findings in a considerable percentage of cases are never associated with clinical disease, or at least a condition which has come to the attention of the physician, the natural resisting forces of the body having overcome the infection and healed the lesion. This thought may lead us to consider lightly the early clinical manifestation of disease, trusting to Nature unaided by physician or patient to overcome the products of infection. If this is our attitude we are playing with fire, for we cannot know although we may make a reasonable estimate, just how great are the products of infection in the body—we cannot know just how great is the natural resisting power of the individual. There is an increased metabolic change, the body cells are more or less poisoned by toxins, a greater demand than normal is being made for tissue repair. The natural forces of the body must be conserved, this resisting power must be built up, a store of energy must be supplied not only to provide for the usual needs of the body but to combat the products of infection. Healing is a slow pathological change and requires months for completion. Usually

all symptoms will disappear before the healing process begins.

Pulmonary tuberculosis should not be accepted as the final and complete diagnosis to the exclusion of all others. In many patients other diseased conditions may be present, although not sufficiently marked to attract notice at the outset. Correction of these coexisting diseased states will clear up the condition; for instance, the removal of diseased tonsils, the cleaning out of obstructed nostrils, attention to the teeth, the correction of pelvic disorders, the removal of old offending appendix, special attention given to gastro-intestinal disturbances which may be of reflex origin or be due to pathological change, as well as simply functional traceable to the toxins of the tuberculous disease. Mohler and Funk<sup>1</sup> conclude from a series of studies on early cases that "tuberculosis causes a definite downward progression in the motility and secretory function of the stomach from the very beginning of the tuberculous disease." All of which leads us to conclude that we are dealing not with the focus of disease in the lung but with the individual who happens to have the diseased lung, that we should start out in the treatment with great hope of success, with an appreciation of the seriousness of the undertaking and the necessity of continuing the treatment over a long period of time.

Now, I have nothing new to present to you today. In the few minutes allowed me I shall review the well-known line of treatment and shall take up the subject under the following headings:

1st. *Medical Supervision and an Intelligent Cooperation on the Part of the Patient.* We have learned by experience the lack of wisdom in the advice frequently given years ago simply "to go out west on a ranch and rough it" or "to go up in the north woods and live in the open." To be sure many a tuberculous man has regained his health while doing these things, but he has not done so because of sound advice. Continuous medical supervision is essential. How intimate the relationship between the physician and patient will be, how often the patient should consult his physician is to be determined by the individual needs and conditions; but the patient should not be trusted to be guided alone by his own feelings. He must have a controlling

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authority outside of his own will and should cheerfully place himself under orders. At the outset we cannot expect to secure intelligent co-operation if we attempt to conceal the diagnosis. Now and then it is best to allow the patient to learn the truth gradually. Often he already suspects he is tuberculous. Usually I believe he appreciates our interest in him and our frankness when we look him straight in the eye and say "You have tuberculosis, the early beginning of the curable disease, and now let us plan together the course of treatment to get well." He who temporizes from month to month with no intelligent idea of the seriousness of the problem is very apt to do badly. Vital questions arise in every instance which require wise consideration, such as "How long before I will be able to go back to my business?"—"Will I be able to return to school in the fall?"—"Do you think I should get married next June?" The housewife who is told suddenly that she must lay aside her accustomed duties in the home usually finds the readjustment difficult. Various social and financial rearrangements are necessary. If we can succeed in exposing fully and frankly the needs of the case and can secure a cheerful enthusiastic response from the patient and his family, we may consider the start is made most auspiciously on the long road to recovery. We often hear it said that the patient cures himself, that we can simply offer advice and it is for him to follow it or reject it. It seems to me this attitude is not fair to the tuberculous individual who is making the fight to get well. We know, alas! that many a patient falls by the wayside for one reason or another, and it is undoubtedly true as Pottenger has said<sup>2</sup> "if he expects to be entertained and find the cure of tuberculosis wholly pleasant his chances of cure are decidedly few;" but let us not forget that he has to travel a long monotonous road often coming upon rough places. Our constant interest in his progress, our firm but friendly reprimand when necessary, our persistent helpfulness help him over the obstacles and strengthen his confidence in the wisdom of our advice.

2d. *Open Air.* It is only within a comparatively short time (about a third of a century) that open air has been extensively employed in the treatment of tuberculosis. Patients have

noted the good effects of open air until they have come to consider it the only essential in treatment and call it the "cure" for tuberculosis. While we recognize it as of prime importance and to be insisted upon continuously, we know it is to be considered only in connection with the other elements of treatment. Open air combined with rest or when indicated with exercise may have a surprisingly beneficial effect upon the various symptoms. I recall hearing Trudeau say many years ago that he knew of no better appetizer than rest in bed out-of-doors. Patients who lie in bed in the open lose their restlessness and regain sleep, fever subsides, the cough decreases. It is not always easy to regulate the outdoor living. Happily prejudices which formerly were troublesome, for example, the fear of night air and of damp and foggy weather, have disappeared for the most part with the growing popular belief in fresh air. The patient under treatment very soon acknowledges the improvement in symptoms and well being, and becomes committed to the open air regime. In this climate during the winter months, various modifications of a rigorous outdoor living are necessary to adapt it to the comforts and needs of the individual patient. Attention is paid to the proper clothing of the body and of the feet, to the arrangements for comfortable sleeping and the wrapping up while sitting out-of-doors. We are dealing not only with human individuals whose physical comfort and happiness is of importance, but with a diseased state the improvement of which will vary with the body's reaction to outdoor living. Much discomfort has resulted from a too strenuous adherence to the sleeping out regime in very cold weather. A well ventilated room with windows open provides all the air a patient can use.

I wish to say a word here regarding climate. It has been truly said "While no climate is specific, all climates are useful." Patients frequently respond well to change of climate, often regardless of the nature of the change. The effect is quite as much psychic as physiological. Contrary to the opinion sometimes expressed, high altitude is not essential in these cases. The two factors which mark our climate in Minnesota, namely a low altitude and a long cold winter, may require special consideration with some patients. At this present season of the year

shall we send our patients to the warmer climates? As we are dealing with the early case manifesting no serious complications, for the vast majority of them the answer to this question is "no." Men and women past middle life, and the very young, may find living out-of-doors less difficult in climates where the out-of-doors is more enticing to them. Experiences in practically all the states of the union, in and near the cities as well as in remote country places, bear testimony to the fact that the results depend not upon where the patient takes the treatment but upon how he takes it, and I believe the fact has been well established that the early cases as a rule do best in a rigorous climate.

3d. *Rest and Exercise.* *The importance of rest cannot be emphasized too strongly.* In the beginning of treatment it should be prescribed for all patients, although there may be but very little evidence of a toxic condition. The average patient at the beginning of treatment has no conception of what we mean by complete relaxation and rest. Reading, talking, all forms of fancy work, are not allowed in our definition. Deep breathing in the active stage is harmful. Worry, anxiety, discontent, interfere very seriously. It is impossible to lay down any rule for rest or exercise in all cases. Patients who are put to bed having only slight rise in temperature and pulse rate, malaise not marked, and other symptoms in slight degree, are allowed to go to the toilet and to sit up for meals. As the tired feeling disappears, the temperature remains normal, and the other symptoms improve, he may rest part of the day in the reclining chair. To lie in bed all day long day after day, when one does not feel very ill requires great confidence in the wisdom of our advice. Here our optimism and enthusiasm as well as cheerful surroundings may have a wonderfully beneficial effect. Our chief and first concern is to impress upon the patient that rest and exercise are prescriptions and are to be taken only in the doses ordered.

The heart should be seriously considered in these early cases as all through the course of the disease it is this organ which bears the brunt of the fight, and during the early stage it may be neglected with disastrous results later. Rest has a beneficial effect upon a heart that is showing irritability from the toxic influence of the dis-

case. Symptoms such as cough, dyspnea, loss in weight, failing appetite, respond well to rest. Hemoptysis requires complete rest continued until all signs of blood spitting cease and the effects of the hemorrhage have disappeared. In general as I have said, we cannot lay down rules, but I am confident we all err in not prescribing sufficiently long periods of rest. If we are in doubt let us prescribe rest as it can do no harm and exercise may be very harmful. The testimony of many experienced observers bears out Pratt's<sup>3</sup> conclusions made on a review of his work of ten years during which time he tried graduated exercise and later insisted upon more prolonged periods of rest. He says "a comparison of the results obtained by the two methods of treatment shows that the strict rest treatment yields the best results." After the prolonged period of rest, when we begin to prescribe exercise, let us not forget that over-exertion lowers vitality and allows an increase in bacillary products. Exercise is to be dosed out cautiously beginning with getting up and going to meals, then a short walk of fifteen to thirty minutes in the mid-morning. Later a mid-afternoon walk is prescribed, and gradually these daily periods of exercise are increased in length. In all cases after exercise is begun, rest periods are continued before and after meals aggregating from three to five hours daily. As the periods of exercise increase, the periods of rest are shortened, and we carry the patient thus gradually and slowly up to a full day of activity, keeping him under constant supervision and noting the effect upon temperature, heart's action, cough and sputum, appetite and weight, and his sense of well-being. It is extremely difficult to be sure that the patient is not overdoing. When the time comes for his return to an occupation it is wise to allow him to test himself at work on part time only, preferably in the mornings, warning him to *keep always within the full measure of his strength* and that his disease has a tendency to relapse if he does not take care of himself.

4th. *Food.* There is no specific diet for the tuberculous. As a high state of nutrition is desired, due consideration is given to the planning of a well-balanced general dietary, correcting errors in diet based on the patient's desire for the less nutritious and less easily digested arti-



cles of food. Formerly we employed forced feeding, three heavy meals a day and in addition raw eggs and milk in large quantities; but the evil effects of this practice were found to be pronounced on the gastro-intestinal tract. On a well balanced nutritious diet we may expect the patient to make slow gradual gain back to his normal in weight. This symptom is carefully watched, the patient is weighed weekly and attention is given any disturbance of the gastro-intestinal functions. In the beginning of treatment supplementing the three regular meals by lunches of milk or of egg-nog is frequently beneficial but should be practiced cautiously. When a slight disturbance of digestive function is noted, the patient may do surprisingly well on a diet largely of milk and can take from 2,500 to 3000 calories of food in this form. Frequently after a short period of liquid diet he is able to go back on the general dietary with no recurrence of digestive disturbance.

#### 5th. *Hydrotherapy, Psychotherapy, Drugs.*

Any outline of treatment for this disease is not complete without some reference to the effects of hydrotherapy; to the importance of psychotherapy, which undoubtedly may have a desirable effect upon the physiological processes; and to the employment of various drugs. Time will not allow a full presentation under this heading. Water properly used is a tonic measure. The cold sponge, the spray and the cleansing bath should be carefully suited to each individual. By means of the bath we aid in keeping the functions of the skin as active as possible and the efficiency of bodily activity is increased.

Creosote probably has no specific action on the tuberculous process. With regard to the effects of arsenic observers are not agreed. Landerer claims that it causes a gathering of leucocytes about the tubercle and that this leucocytosis is an important factor in healing. Iodine probably has no place in the treatment of these early cases, although it may be used to advantage in the later fibroid condition. Iron, hypophosphites, cod liver oil, may be employed, but as a rule these early cases do not require them.

6th. *Tuberculin.* This agent properly given to the right patient by one who has experience in administering it seems to be beneficial in a certain percentage of cases. It is difficult to draw any accurate conclusion as to the real value

of tuberculin employed therapeutically, but we have no better authority than Trudeau who said thirteen years ago<sup>4</sup> "My belief in tuberculin immunization as favorably influencing the course of chronic tuberculosis rests on no more stable foundation than a strong clinical impression gained many years ago, an impression which has gradually become a conviction through years of observation. We have much to learn about tuberculin treatment, but even in the present state of our knowledge I am inclined to think that the production of tuberculin immunity by the mild clinical method is capable of favorably influencing the course of chronic tuberculosis, of prolonging life, and in many cases of shorting a commencing infection or extinguishing the smoldering fires of a chronic infection." Tuberculin has been used by many men with varying degree of enthusiasm. I have used it in selected cases for several years and still use it, believing that if properly given it is always harmless and with some patients proves to be beneficial. A specialist<sup>5</sup> at Saranac of many years experience whose opinion is universally respected has written me within the past week in reply to my inquiry regarding his present attitude on this subject: "I must say I advise tuberculin today as much as ever and I believe it is a valuable thing. I think tuberculin is just as valuable today as it was twenty years ago, probably more so because more discrimination can be used today in selecting the patients with lesions which are inactive or at least not apparently progressing and giving them a stimulus which makes them heal." With the early cases under discussion today, after the activity of the disease subsides and they are on exercise, I believe the therapeutic use of tuberculin not employed indiscriminately but in selected cases and properly given offers an additional means in connection with the "hygienic-dietetic" treatment of bringing about a permanent arrest of the disease.

7th. *Treatment in Childhood.* This brief outline of the treatment applies equally well to children as to adults, except with the child, a longer period of watchfulness is necessary after apparent recovery. As he grows through adolescence to young manhood his normal well-being should be maintained, and if we can impress upon the parent the necessity of frequent per-

iodic examinations we have accomplished much toward the prevention of recurring disease. Some of us will be directly associated with school authorities and may be able to influence for better health conditions in the schools. As we treat these early cases, especially in childhood, we are vitally interested also in the prevention of recurrences and in the spread of infection in the home. The physician, as Calmette and Guinard have well said, "with a clear vision of the sociological role he is to fill will understand that his essential function is to direct the tuberculosis prevention in the family. He will bring to the accomplishment of this educational mission all the determination, all the devotion, all the energy of which he is capable."

8th. *The Advantage of the Sanatorium.* The sanatorium is the place *par excellence* where the treatment should be taken. It can be done and is being done successfully in the home. The private apartment with sleeping porch, the tent in the back yard, the shelter on the roof, or some other improvised means, may provide the patient with proper surroundings. But in the majority of cases, these cannot be a substitute for the well organized sanatorium especially built and equipped for the treatment of tuberculosis. If all patients could have a course of treatment in a sanatorium for a long enough time to become accustomed to the routine, continuing after discharge from the institution under home supervision, better results would undoubtedly be obtained than by home treatment alone. There is a crying need for more sanatoriums for these patients. The enthusiastic support of the sanatorium treatment by the physicians of any community will do more than any other one thing to popularize the movement in that community and to increase the sanatorium facilities.

9th. *Results.* It has been said that four out of five of these early cases get well. This percentage may be somewhat too high. Statistical studies are usually based not only upon immediate results but also upon ultimate results. The percentage of "apparently arrested" cases who go on to a modified "arrest" and later "cure" will naturally depend upon the social status of the individual and the necessity of his earning a livelihood. At the Adirondack Cottage Sanatorium a recent report shows that sixty-one per cent of the patients discharged during a period

of one to ten years were well and working at the time of the report. Other institutions publish similar figures. If there is any measure more than another which will bring about better end results, it is I believe, a longer period of treatment in the sanatorium and a close supervision of the patient after discharge from the institution.

In this brief review of the treatment I have attempted to emphasize the importance of medical supervision." The more optimistic and enthusiastic the physician who treats chronic diseases the better the results." If we fail to do our part it is because we lose interest, our store of optimism and enthusiasm becomes exhausted. I have found much cheer recently in the reading of Cevey's book entitled "Peut-On Guérir Les Tuberculeux." His buoyant optimism has carried him over many a rough place during the years of practice with this disease and his philosophy is well expressed in his words "Quelle-qu soit la difficulté de la tâche il ne tient q'a nou d'en venir a' bout,"—"whatever may be the difficulty of the task we must continue to the end."

In the treatment of tuberculosis we come into intimate relation with the various human problems of the individual. We cannot but have the greatest respect for the man or woman who has travelled cheerfully along the road to ultimate recovery. To guide these people along the way, to aid them in learning the lessons which will help them after recovery to reorder their lives at home and at work that they may keep well, is, indeed, a privilege.

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## EDITORIAL

### COMPULSORY STATE HEALTH INSURANCE

The misfortune of sickness is often a calamity not only because of the physical suffering entailed, but because of the enormous expense incurred in our present day complex mode of living. The average American experiences from sickness a serious financial set-back from loss of wages, hospital charges, physicians and nurses fees, and cost of medicine. Why not let the state assume this already present risk, either in whole or in part?

At first thought the first impression produced is most favorable, as is often the case regarding socialism. Why not extend the system and let the state insure against other equally as serious hazards such as accidents, old age, unemployment, and even death?

The question of health insurance so-called, for it is as a matter of fact a sickness insurance, is fundamentally a governmental question. It is a question that involves the foundation of our present social and political fabric and should be settled by our ablest statesmen. It is not a question for physicians to decide and it should not be decided by the unthinking public nor by mere politicians. In our representative form of government the question will

actually be decided by our elected representatives and the will of the majority of the people will be exerted through the ballot box. In this question the medical profession is interested, and some admirable views on this subject have been expressed locally by members of the profession.\*

The question is, whether we want to change the whole fabric of our American form of government from the individualistic to the paternalistic. The paternalistic form of government may exist in either a monarchy or a democracy. As an example of the former we have had Germany; of the latter Great Britain has shown decided tendencies, particularly in the caring for the health of her citizens. The ancient empire of Rome is pointed out as a warning.

Each year various health bills are introduced in the state legislatures. The most notable one was the Health Centers Bill introduced by radical labor elements in New York State last year and defeated. The Illinois legislature is to consider a similar bill this year. If such bills were passed in each state it is estimated that a sum of money amounting to from one half to one billion dollars would be thrown into the hands of the government for yearly disposition.

Such a change would affect the public very markedly. The recklessness of youth would be encouraged as the value of health would be lowered. Malingering would be encouraged and if benefits were not to be paid under seven days of sickness, many minor illnesses would show a crisis on the seventh day. The public would receive poorer medical treatment on the whole.

A large percentage of the medical profession would be placed in the employ of the government. While the average physician would have fewer bad debts, his income would be smaller. The undeniable stimulus exerted by the hope of a larger income would be almost nil. Young men of less ability would be attracted to the profession. Useless examinations would be multiplied. With the increase in number of

\*Litzenberg, J. C.—Socialism and the practice of medicine. Minn. Med., Vol. 3, No. 11.

Andrews, J. W.—Social insurance. Minn. Med., Vol. 3, No. 12, Appendix p. VI.

Hoffman, F. L.—Compulsory health insurance and the medical profession. Minn. Med., Vol. 4, No. 2.

examinations less careful and thorough work would be done.

Whe whole scheme of state insurance is un-American. The typical American much prefers the personal element more truly present between private physician and patient, and which gives much of the charm to the practice of the greatest profession in the world.

We are heartily in favor of insurance against sickness. Many of the larger business houses, guilds and professions are carrying on this from of insurance very satisfactorily. The individuals directly benefited pay the premiums. But for the sake of all concerned let us not have Compulsory State Health Insurance.

### PRIVILEGED COMMUNICATIONS

The bulwark which has so long protected physicians in their relations with patients seems to be seriously undermined by a decision of a Nebraska court, which in effect says that a physician not only is justified but also bound to reveal the confidential statements of a patient, when by withholding such information another person's health may be injured. This attitude of the courts is novel, but has its basis in the recognition by courts of the germ theory of disease and the beneficent effects of a policy which would prevent contagion.

Under the common law there is no such thing as privileged communication. It was held that no facts should be withheld in the search for justice, irrespective of the personal difficulties that might result. In theory this is true. But public policy has in this country swayed nearly all the state legislatures to pass statutes which excuse a physician from disclosing any fact which it was necessary for him to know in order properly to diagnose or treat disease. Thus the purposes of law were subordinated to personal privileges.

The new aspect of the relation of the physician to his patient is a modern innovation and should have very restricted application. It might be deemed wise policy for a physician to be allowed to disclose the existence of venereal disease in a patient if thereby contagion could be prevented. It is, however, hard to see how in any other relation such a policy would be productive of good. It would hardly seem proper, for instance, to allow a physician to

testify as to the facts of pregnancy, miscarriage, pelvic disease or other intimate facts of the personal history of his patient, where no such special advantage to the general community can be conceived.

Public policy is to be regarded as the criterion by which such communications should be privileged. Public policy concerns the general welfare, and it is a matter of doubt whether the recent decision can be upheld under that plea. If the physician were not excused from revealing the secret facts of a patient's life, how difficult would it be for the physician to receive from his patient such a necessary fact for diagnosis and treatment as the previous existence of syphilis. What patient would not refuse to admit such disease if he believed that the physician would not regard the communication as privileged. Would not greater harm be done to the general public by the concealment of such information, than by its admission under the former pledge of silence.

It is of course true that years ago when the laws of privileged communication were passed by various legislatures, venereal disease was not regarded with the seriousness with which fuller knowledge in recent years has surrounded it, and perhaps the tendency of the courts is toward what it believes to be the greater protection of the public and a more open attitude in regard to diseases which formerly were not publicly spoken of. In this respect there may be a grain of wisdom. But it is to be feared that the new attitude of the courts may reach in other directions in a manner calculated to overbalance the expected benefit by disastrous consequences of the destroyed confidence of the patient in the physician.

The doctor must have the truth from his patient. The patient must be assured that his statements to the physician will be kept in confidence. Where either of these conditions do not obtain incalculable harm is sure to result. Wise public policy should direct that any change in the relation between patient and physician should be brought about only under direct necessity and after weighing all the disadvantages as well as apparent benefits.

A. S.



## TORTS AND THE STATUTE OF LIMITATIONS

Now that the Legislature is in session, the members of the Medical profession, throughout the State, ought to give serious attention to the matter of remedying a defect in the laws of Minnesota with respect to the time within which suits for malpractice may be commenced.

Under the laws as they now stand, actions for "libel, slander, assault, battery, false imprisonment, or other tort resulting in personal injury" must be commenced within two years after the accrual of the cause of action. By another section of the statutes it is provided that actions for "criminal conversation, or any other injury to the person or right of action not arising on contract and not hereinafter enumerated" shall be commenced within six years. Upon the face of these statutes, one would suppose that an action for malpractice, which is really founded on a charge of negligence, ought to be included in the two year statute. However, some years ago our Supreme Court, construing these statutes, held, by a divided court, Justice Mitchell dissenting, that actions for personal injuries, founded on negligence, are governed by the six year and not the two year limitation. Since that time all personal injury actions, including malpractice actions, have been treated as governed by the six year statute.

The medical profession, as a class, are, of course, not concerned with the question as to what shall be the limitation of time within which actions for personal injuries generally shall be brought. But they are vitally concerned in the question as to what shall be the limitation of time within which actions for malpractice shall be brought. To permit such actions for malpractice to be commenced after a lapse of six years, from the time that the patient was treated, often results in great injustice to the physician or surgeon sued. In most all of such cases, nurses are vital witnesses. In the very nature of things, considering the fact that nurses are usually temporarily employed, or are merely serving their apprenticeship, and move about to all parts of the country before they settle down to some permanent employment or marry, it often occurs that they are unavailable as witnesses

when the trial is long delayed. Very often the hospital records are vital as evidence in behalf of the medical man sued, and these cannot be used unless the nurses who made them are available as witnesses. Any person who has a meritorious malpractice case can, without hardship, arrange to start such case within a period of two years.

In many states the period within which a suit for malpractice must be commenced is even less than two years. In Alabama, California, Delaware, Kentucky, Louisiana, Ohio, Tennessee, Texas, Virginia and West Virginia, the period of limitation, for the bringing of malpractice cases, is one year. In Arizona, Colorado, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, New York, North Dakota, Oregon, Pennsylvania, Rhode Island and Wisconsin, it is two years. In various other states it is three or four years. In one state it is five years. And in only six states in the entire Union is the period six years. Thus in the vast majority of states, the sound reasons for requiring suits for malpractice to be commenced within a reasonable period of time, not exceeding two years, has been recognized. Medical men throughout the state should unite to bring this matter to the attention of the members of the Legislature, to the end that this defect in the laws of the State should be corrected, in justice to the medical profession.

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## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

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The Southern Minnesota Medical Association held a meeting on November 29th and 30th, 1921, at Mankato. The program was a most interesting one and the visiting doctors who added interest to the program were Dr. Hugh Cabot, Ann Arbor, Mich.; Dr. E. B. Freeman, Baltimore, Md.; Dr. Harry E. Mock, Chicago; Dr. Frank Smithies, Chicago, Dr. Ruben Peterson, Ann Arbor; Dr. H. Winett Orr, Lincoln, Neb.; Dr. Emil G. Beck, Chicago; Dr. Truman W. Brophy, Chicago, and Dr. Wm. L. Sheaer, Omaha.

The following officers were elected:

Dr. Wm. J. McCarthy, Madelia, president; Drs. Edward Keyes, Winona, and Walter R. Ramsey, St. Paul, vice president; Dr. H. T. McGuigan, Red Wing, secretary, Dr. G. F. Merritt, St. Peter, treasurer, and Dr. A. F. Schmitt, Mankato, managing-director.

The next meeting will be held in Winona during the last week in June, 1921.

## OBITUARY

Dr. Jasper Bedint died at his home in Kasson, Minnesota, on November 24, 1920, at the age of eighty-two years.

Dr. Wm. Hambroer, of Eden Valley, Minnesota, died on November 19, 1920, at the age of seventy-two years.

Dr. O. W. Anderson, of Rochester, Minnesota, died at his home December 26th, at the age of eighty years.

Dr. F. R. Mosse, of Rochester, Minnesota, died on December 25, 1920, at the age of sixty-five years.

Dr. Florado H. Welcome, of Minneapolis, died on December 22, 1920, at his home, at the age of sixty-two years.

Dr. Frederick R. Baldwin, physician at Glen Lake Sanatorium, died at the University Hospital in November, 1920.

Dr. John Gooch Whittemore, of Donnelly, Minnesota, died at his home on November 22, 1920, at the age of forty-nine years.

## OF GENERAL INTEREST

Dr. C. M. Pearson, M. D. has moved from Ambrose, N. D., to Breckenridge, Minnesota.

Dr. Arthur E. Ferlay, of Worcester, Massachusetts, has located in Rochester, Minnesota.

Dr. F. P. Silvernale and Dr. S. Erickson succeed Dr. H. P. Blong, at Elmore, Minnesota.

Dr. O. M. Sanderson, of Minnesota, is taking a postgraduate course this winter in Chicago.

The Interurban Clinical Society held a very successful meeting in Rochester early last month.

Dr. F. E. Engstrom has returned to Wanamingo, where he will resume practice of medicine permanently.

Dr. Dennis W. Sullivan, of Milbank, Minnesota, has received a commission as captain in the United States Army.

Dr. Scott Searles formerly, of Crookston, is now associated with the Murphy Radium Service, Besse Building, Minneapolis.

The marriage of Dr. Clyde A. Undine and Miss Effie Donna Heighstedt took place December 30, 1920, at Minneapolis, Minn.

Dr. M. S. Henderson, of Rochester, was elected President of the Central States Orthopedic Club at the recent meeting in Chicago.

Dr. Leslie Grant Hill, of Sioux Falls, S. D., announces the removal of his offices from The Moe Hospital to the Boyce-Greeley Building, Suites Nos. 459-461.

At a meeting of the Clay-Becker Medical Society in December, Dr. B. T. Bottolfsson, of Moorhead, was

elected president, and Dr. O. Larson, of Detroit, secretary and treasurer.

Dr. William B. Wright, Jr., formerly associated with Dr. Justus Matthews, of Minneapolis, is now engaged in practice limited to the nose and throat, in Los Angeles, California.

Drs. E. H. Frosh, P. C. Davison, B. J. Branton, A. F. Branton and C. J. Ahrenberg, have combined forces in Willmar, Minnesota, into what will be known as the Willmar Hospital and Clinic.

Last August Dr. Keen presided over the International Congress of Physicians and Surgeons, in Paris. Dr. Keen has served as a medical officer in the Civil, Spanish-American and World wars.

Dr. King and Dr. Hook, who have been assigned to the Mayo Foundation by the Navy Department for a short period of study, have each recently been awarded a Navy Cross for extraordinary heroism in action.

Dr. S. M. White, Professor of the Medical School, University of Minnesota, gave an address by invitation before the Chicago Medical Society, Wednesday evening, January 12, on "The Clinical Application of Digitalis."

Dr. Ernest Strader, of Louisville, Ky., is the new medical director of the Buena Vista Sanatorium, succeeding Dr. W. D. Beadie who has been made Executive Secretary of the Ramsey County Public Health Association.

Alpha Omega Alpha, medical scholarship fraternity, announces the election of the following members; Clarence M. Jackson, (honorary), J. A. Myers, Ruth E. Boynton, David H. Johnson, Roger L. J. Kennedy and Charles E. Merkert.

Dr. J. Arthur Myers announces the removal of his offices from the Metropolitan Bank Building to 323 LaSalle Building, Minneapolis, where he will continue the practice of internal medicine, giving special attention to diseases of the lungs.

Dr. W. W. Covell, of St. Peter, was elected president of the Nicollet-LeSueur County Medical Society, at the meeting held in December. Dr. J. W. Daniels was elected vice president; Dr. Daniel W. MacDougal, treasurer, and Dr. Jos. E. LeClerc, secretary.

Federal Dam, Minnesota, is without a physician. This is a good community and should prove an attractive location. Any one interested should communicate with Mr. William R. Bourdon, Secretary of the Federal Dam Community Club of Federal Dam.

Dr. R. L. Kirsch, of Crookston, was elected president of the Red River Valley Medical Association at their meeting in December. The other officers elected were: Dr. A. L. Hoiland, Argyle, vice president; Dr. H. M. Blegen, Warren, secretary-treasurer.

Dr. E. W. Buckley, of St. Paul, has recently been appointed chairman of the National Committee of the Knights of Columbus, to investigate tuberculosis in the United States. This committee will study the tuberculosis situation in the United States and con-



sider the advisability of constructing a large national sanatorium for the Order.

Dr. F. Thompson, of Chicago, was elected president of the Soo Line Surgical Association, at its annual meeting in Minneapolis in December. Dr. P. E. Pilar, of Paynesville, Minnesota, was elected vice president, and Dr. John H. Richmiller, of Minneapolis, Chief Surgeon for the railroad, secretary and treasurer.

Dr. E. W. Buckley, of St. Paul, has attained international prominence through his work as Supreme Physician of the Knights of Columbus. On his visit to Europe during the summer of 1920 he was decorated with the French Legion of Honor, The Star of Morocco, and was made a citizen of Paris. In Rome he was decorated by the Pope with the Order of the Knights of St. Gregory.

Dr. Henry Helmholz, of Chicago, has gone to Rochester as Professor of Pediatrics in the Mayo Foundation and Head of the Section on Pediatrics in the Mayo Clinic. Since returning from two years of graduate study in Berlin and Breslau, Dr. Helmholz has been Assistant Professor of Pediatrics in Rush Medical School and Chief of Medicine in the Children's Memorial Hospital, Chicago.

Dr. J. F. Corbett, of Minneapolis, has resigned from his full-time salaried position in the Medical School, but retains his rank as Associate Professor of Surgery, and expects to continue in the University Clinical service at the Minneapolis General Hospital. The newspaper report that his resignation of his former position was in any way due to the Mayo Affiliation, was incorrect and misreported.

The Minnesota State Board of Health has been particularly active in the past four months in the prosecution of violators of recent laws enacted for the control of venereal diseases. In addition to the arrest of individuals for delinquency in treatment, two physicians in the state have been prosecuted for failure to report cases, and in October two druggists were successfully prosecuted for selling remedies in violation of this same law.

On January 20, 1921, a testimonial dinner was given Dr. W. W. Keen, the well known surgeon of Philadelphia, by his many friends in celebration of his eighty-fourth birthday. A life size bronze bust of Dr. Keen, made by Samuel Murray, the Philadelphia sculptor, was presented to him upon this occasion. On his last trip to Europe Dr. Keen was decorated by the Belgian Order of the Crown by King Albert for the services he gave during the war.

The Minnesota Public Health Association column which formerly appeared in Minnesota Medicine has been discontinued, as this Association resumed publication of the Minnesota Health Journal in September, 1920. The Minnesota Health Journal is published weekly in sixteen page issues, and the subscription is only twenty-five cents a year. Physicians desiring to subscribe should address the Association at the Shubert Building, St. Paul, Minnesota.

Dr. Braasch has recently returned to the Mayo Clinic after three weeks absence attending meetings in the east. He attended the meeting of the executive committee of the American Urologic Association of which society he is president. Dr. Braasch acted as chairman of the executive editorial committee of the Journal of Urology at which meeting arrangements were completed for the first number of the journal as the official organ of the American Urologic Association.

The fifth annual session of The American Congress on Internal Medicine will be held at Baltimore, Md., week of February 21-26, 1921. The activities of The Congress will be largely clinical. Ward-walks, laboratory demonstrations and group or amphitheatre clinics will be conducted daily by members of the medical faculties of The Johns Hopkins and The Maryland universities. Further information may be secured by addressing The Secretary-General, 1002 N. Dearborn Street, Chicago, Ill.

Dr. Kendall of Rochester, has received notification from the Secretary of the Board of Directors of the City Trusts of Philadelphia that he has been awarded the John Scott Medal and premium of \$800.00 for his work on thyroxin. In 1816, John Scott, a Chemist of Edinburgh, bequeathed \$4,000 to the City of Philadelphia, the interest of which was "to be laid out in premiums to be distributed to ingenious men and women who make useful inventions . . ." The chemical investigation of the thyroid was begun by Kendall in 1919. The iodine-containing compound was isolated in 1914 in pure crystalline form. The chemical structure of this compound was shown in 1917 to be 4, 5, 6 tri-hydro—4, 5, 6 tri-iodo,—2 oxy,—beta indolepropionic acid, and it was named thyroxin from its chemical nucleus (oxy-indol). Since that time it has been shown that thyroxin possesses the physiologic activity of the thyroid gland. It relieves all symptoms of myxedema and induces growth in cretins. Thyroxin controls the rate of oxidation in the body; 1 mg. increases the basal metabolic rate 2 per cent.

During the St. Paul clinic week there was organized at Fort Snelling The Northwestern Medical Officers Association of the World War. Membership is limited to physicians, surgeons and dentists who served in the army or navy of the United States in any of our wars or the army or navy of the Allies during the World War.

The object as quoted from the constitution—"Shall be to foster the spirit of patriotism and good fellowship which characterized the medical profession during the great war and to assist by its influence any measures for the good of the service."

There should and will be an opportunity for constructive work by this organization during the years to come.

The time and place of the annual meeting is in the hands of the executive committee.

Every former medical officer in the Northwest

should join before March 1st. By so doing he becomes a charter member. Send one dollar for annual dues together with your name, rank and organization to the secretary-treasurer, Dr. F. J. Savage, Lowry Bldg., St. Paul, Minn.

The following officers and executive committee were nominated by the nominating committee and duly elected: President, Dr. Thos. J. Maloney, St. Paul; vice president, Dr. Arthur S. Hamilton, Minneapolis; secretary-treasurer, Dr. F. J. Savage, St. Paul. Executive committee—(physicians)—Dr. Warner G. Workman, Tracy, Minn.; Dr. Knox Bacon, St. Paul; Dr. F. O. Brigham, Stanley, N. D.; (dentists) Dr. Sam Ziegler, St. Paul; Dr. Tournquist, Minneapolis.

## NEW AND NON-OFFICIAL REMEDIES

During December the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

### Calco Chemical Co.:

Salicaine.

### Coleman Laboratories:

Bacillus Bulgaricus.

### E. R. Squibb and Sons:

Procaine.

H. T. Procaine.

Solution Tablets Procaine.

### Winthrop Chemical Co.:

Adalin Tablets 5 grains.

Veronal Tablets 5 grains.

Novaspirin Tablets 5 grains.

### Lederle Antitoxin Laboratories:

Typhoid Glycerol-Vaccine.

Typhoid Combined Glycerol-Vaccine.

Pertussis Glycerol-Vaccine.

Pneumococcus Glycerol-Vaccine.

### The Beebe Laboratories:

Pneumococcus Vaccine No. 14.

Typhoid-Paratyphoid Vaccine No. 39.

Colon Vaccine (Acne) No. 11.

Acne (Mixed) Vaccine No. 10.

### Nonproprietary Articles:

Phenetsal.

Saligenin.

**Mercury (mercuric) Benzoate-Seydel.**—A brand of mercuric benzoate (See New and Non-official Remedies, 1920, p. 181) complying with the N. N. R. standards. Seydel Manufacturing Co., Jersey City, N. J. (Jour. A. M. A., Dec. 4, 1920, p. 1569).

**Culture of Bacillus Bulgaricus-Coleman.**—A pure culture of bacillus bulgaricus, marketed in bottles containing about 90 c.c. This culture is stated to be suitable for all purposes for which bacillus bulgaricus is used (See general article on Lactic Acid Producing Organisms and Preparations, New and Non-official Remedies, 1920, p. 156). Coleman Laboratories, Wheeling, W. Va. (Jour. A. M. A., Dec. 18, 1920, p. 1717).

**Pneumococcus Glycerol Vaccine (Types I, II, III, Polyvalent)—Lederle.**—A suspension of killed pneumococci of characteristic strains of Types I, II, and III (equal proportions) in a vehicle composed of glycerol, 66 per cent; physiological solution of sodium chloride, 33 per cent, and cresol, 1 per cent. Supplied in packages of three vials containing the glycerol vaccine and of three vials of sterile diluent with which to make the proper dilution of the vaccine at the time of injection. For a discussion of the actions and uses of pneumococcus vaccine, See New and Non-official Remedies, 1920, p. 286. Lederle Antitoxin Laboratories, New York.

**Pertussis Glycerol Vaccine-Lederle.**—A suspension of killed pertussis bacteria (Bordet) of eight strains, in a vehicle composed of glycerol, 66 per cent; physiological solution of sodium chloride 33 per cent, and cresol, 1 per cent. The product is supplied in packages of five vials containing the glycerol vaccine, and five vials of sterile diluent with which to make the proper dilution of the vaccine at the time of injection. For a discussion of the actions and uses of pertussis bacillus vaccine, see New and Non-official Remedies, 1920, p. 235. Lederle Antitoxin Laboratories, New York.

**Typhoid Glycerol Vaccine (Prophylactic)—Lederle.**—A suspension of killed typhoid bacteria (Rawling's strain) in a vehicle composed of glycerol, 66 per cent; physiological solution of sodium chlorid 33 per cent, and cresol, 1 per cent. The product is supplied in packages of three vials containing the vaccine, and three vials of diluent with which to make the proper dilution of the vaccine at the time of injection. For a discussion of the actions and uses of typhoid vaccines, see New and Non-official Remedies, 1920, p. 291. Lederle Antitoxin Laboratories, New York.

**Typhoid Combined Glycerol Vaccine (Prophylactic)—Lederle.**—A suspension of killed typhoid bacteria (Rawling's strain), 50 per cent; killed paratyphoid bacteria, Type A, 25 per cent, and killed paratyphoid bacteria, Type B, 25 per cent, in a vehicle composed of glycerol, 66 per cent; physiological solution of sodium chlorid, 33 per cent, and cresol 1 per cent. The product is supplied in packages of three vials containing the vaccine, and three vials of sterile diluent with which to make the proper dilution at the time of injection. For a discussion of the actions and uses of typhoid vaccines, see New and Non-official Remedies, 1920, p. 291. Lederle Antitoxin Laboratories, New York (Jour. A. M. A., Dec. 25, 1920, p. 1783).

## PROPAGANDA FOR REFORM

**More Misbranded Nostrums.**—The following products have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act: Linonine (Kerr Chemical Co.), held misbranded on the ground that the curative claims were held false and fraudulent. Valentine's Sarsaparilla Compound with Potassium Iodide (Allan Pfeiffer Chemical Co.), sold under therapeutic claims which were false and fraudulent. Olive Branch (Olive



Branch Remedy Co.), misbranded in that the curative claims were false and fraudulent. Prince's Pills, Liniment and Tru-Vigor Nerve Tablets (Poston Drug and Chemical Co.), misbranded in that the therapeutic claims made for them were held false and fraudulent. Mrs. Summers' Absorbent Pile Remedy, Mrs. Summers' Womb, Ovarian and Kidney Tonic and Vitalizer Tablets and Mrs. Summers' Heart, Brain and Nerve Pills (Vanderhoof and Co.), misbranded in that they were sold under therapeutic claims which were false and fraudulent. Compound Syrup of Hypophosphites, Bromo Febrin, Hystoria, Aromatic Cod Liver Oil, Red Cross Kidney and Liver Regulator, White Pine and Tar Syrup, and Boro-Thymine (Cal-Sino Co.), misbranded in that the therapeutic claims were false and fraudulent (some were also held adulterated because their composition was misleading or falsely declared) (Jour. A. M. A., Dec. 11, 1920, p. 1663).

**Physician's Stock in Prescription Products.**—Is the public getting a square deal when physicians are financially interested in the products that they may be called on to prescribe? Is the average layman's confidence in the medical profession likely to be enhanced when he learns that the physician to whom he went for treatment has a financial interest in the therapeutic agent which was prescribed? It cannot be too often emphasized that it is against public interest and scientific medicine for physicians to be financially interested in the sale of products which they may be called on to prescribe for the sick. It is perfectly true that there are many physicians who would not consciously permit financial considerations to warp their judgment, but it is not humanly possible to remain unbiased in cases of this sort (Jour. A. M. A., Dec. 11, 1920, p. 1662).

**The Parry Medicine Co. barred from the Mails.**—For some years Pittsburgh has harbored a quack concern known as the Parry Medicine Company. The president of the company was one Leonard L. Parry, who advertised himself as "Dad Parry, the Healer," and also as "The Miracle Man." In April, 1917, Parry, who is an obviously ignorant faker, was arrested and convicted of the illegal practice of medicine and was sentenced to pay a fine and to serve a six months sentence in jail. Apparently as soon as Parry got out of jail he went right back to his quackery. As a result the federal authorities took action, and the Parry Medicine Co. has been denied the use of the mails. The "medicines" put out by the Parry concern were fourteen in number and were numbered consecutively. They were essentially the same in composition, differing only in flavoring. Each was composed approximately of alcohol, 25 per cent; water, 25 per cent, and olive oil, 50 per cent, to which was added a few drops of essential oils. No. 1 was for tuberculosis, lungs, bones or flesh, gallstones or tapeworm. No. 2 was for cancers, adenoids, hemorrhoids, piles, asthma, goiter, typhoid and all other fevers. Extensive curative claims were similarly as-

cribed to the remaining twelve preparations (Jour. A. M. A., Dec. 18, 1920, p. 1732).

**German Institute for Examination of Pharmaceuticals.**—It is proposed that the commission founded years ago by the German internists—the *Arzneimittel-Kommission*—is to be changed into an institution to investigate new pharmaceutical articles and supply information thereon to physicians on demand. An information bureau and bibliographic center is planned, and it is proposed to test new inventions for the manufacturers. The commission announces that it has been decided not to restrict the examinations to the chemical, pharmaceutical and pharmacologic side of the matter, but in given cases tests and investigations at the bedside will be made. It is stated that the pharmacologic investigations are to be made at the pharmacologic institute of the University of Berlin, which is in charge of Heffter, and that the institute is to be the headquarters of the new *Prüfungsamt* (Jour. A. M. A., Dec. 25, 1920, p. 1791).

## NEWS OF THE HOSPITALS

Dr. Mitchell of the St. Paul Hospital staff returned recently from an Eastern trip.

St. John's Hospital, St. Paul has added the Coolidge System to its X-Ray department.

Northwestern Hospital of Minneapolis will soon inaugurate a Metabolic department.

W. Mills Superintendent of the Swedish Hospital, Minneapolis has fully recovered from the illness that he recently suffered.

The annual meeting of Mounds Park Sanitarium, St. Paul was held January 11; Midway and Merriam Park Hospitals, were represented. No change in the personnel of the executive staff was reported.

The 1921 Class of the West Side General Hospital, St. Paul was graduated on the evening of January 11, when six student nurses received their diplomas. During the year just passed the Hospital cared for 1134 patients.

A series of parties for convalescing service men has been held at St. Luke's Hospital, St. Paul during the past month. At the Christmas party, staged by the American Legion, splendid gifts were distributed, among them being a special surprise package from Mrs. James J. Hill.

The General Hospital of Minneapolis has just admitted seven students for an eight months Laboratory course and the Hospital is keeping the Minneapolis Medical profession supplied with Laboratory graduates. Inquiries are coming from various parts of the country concerning the General Hospital's course in Anesthesia.

The management of The Oconomowoc Health Resort, Oconomowoc, Wisconsin, announce the opening of two new buildings. One is for chronic nervous cases, and the other is an isolated building for "Rest Cure" patients. The latter units conform in construction to the previous ones, being absolutely fire-

proof. The classification of patients is complete in every respect.

St. Joseph's Hospital Alumnae Association held their regular meeting Friday, January 14, at 3 p. m. The following officers have been re-elected for the coming year: Miss Anne Lawler, president; Miss M. Rau, vice president; Miss M. Blesner, secretary; Sister M. Oswald, treasurer. Board of Directors: Sister M. Jerome, Miss B. Culliton, Miss Ann Grady.

Dr. Baldwin, Superintendent of Miller Hospital, St. Paul was in Chicago the early part of the month. He has prepared a series of articles on Hospital organization which, it is reported, will be published in *Modern Hospital*. Dr. Baldwin's method of Business Administration is unique, as well as that of his assistant, A. G. Stasel who has evolved an original Institutional Accounting System that has attracted the favorable attention of many Northwest Institutions.

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## PROGRESS

Abstracts to be submitted to Section Supervisors.

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### MEDICINE

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#### SUPERVISORS:

F. J. HIRSCHBOECK,  
FIDELITY BLDG., DULUTH.

THOMAS A. PEPPARD  
LA SALLE BLDG., MINNEAPOLIS

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**THE IMPORTANCE OF PHYSICAL SIGNS IN THE PROGNOSIS OF PULMONARY TUBERCULOSIS:** Francis B. Trudeau (Amer. Rev. of Tub. Vol. 4, No.7). A study was made of the physical signs particularly rales, on admission and discharge of 979 patients discharged from the Trudeau Sanatorium from 1907 to 1913. The average residence of these patients in the sanatorium was five and one-half months during which time 43.1 per cent showed an increase in their rales, 40.6 per cent showed a decrease and 16.2 per cent remained stationary. The 1918 reports of these patients showed that of those who developed increased signs during their residence 52.9 per cent were well (working for past two years), 14.7 per cent were living (had either relapsed or become chronic), 31.0 per cent were dead, and 1.4% were untraced. Of the patients whose physical signs decreased during their residence 69.8 per cent were well, 12.8 per cent were living (had either relapsed or become chronic), 15.8 per cent were dead, and 1.5 per cent were untraced. The patients whose physical signs remained stationary presented the best records as 78.0 per cent were well, 10.7 per cent were living, 10.1 per cent were dead, and 1.2 per cent were untraced, however, 49.0 per cent of the patients in this group were without rales while in the sanatorium.

From the above figures it is seen that a patient in

whom the physical signs decrease has proportionately a seven to five better chance of remaining well and double the chance of not dying within five to eleven years after discharge when compared with a patient in whom the signs increase.

In this series there were 511 cases discharged as arrested. In 1918 (five to eleven years later) 68.3 per cent of these were well, 11.5 per cent were living, 19.0 per cent were dead and 1.2 per cent were untraced.

In dealing with the total 979 cases regardless of the admission or discharge condition and also of physical signs 63.8 per cent were well, 13.3 per cent were living, 21.5 per cent were dead after a period of from five to eleven years after discharge.

Dr. Trudeau concludes that physical signs and symptoms cannot be compared separately, but should be considered together in making a prognosis.

J. A. MYERS.

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**SOME PROBLEMS IN THE DIFFERENT DIAGNOSIS OF PULMONARY TUBERCULOSIS:** James Alexander Miller (The Amer. Rev. of Tub., Sept., 1920). The problem the author presents is not the diagnosis of early pulmonary tuberculosis but the conditions which simulate a beginning phthisis. These latter conditions are not infrequently diagnosed tuberculosis and the patients consigned unnecessarily to a sanatorium. Although probably less harm is done by pronouncing a non-tuberculous case tuberculous, than by labeling a tuberculous case as non-tuberculous, there must result dissatisfaction over the inaccurate diagnosis as well as over the injustice rendered and in some instances hardship caused by the stamp of a much dreaded disease.

The conditions reviewed are divided into two groups:—

(1) Those in which the history and symptoms are suspicious of tuberculosis, but the local lesion is slight and difficult to find. A problem in physical diagnosis.

(2) Those presenting very definite physical signs in the lungs. A problem of interpretation.

I. Those in which suspicious symptoms predominate. (a) General asthenia.—Usually women and children whose strength and endurance are slight and who suffer from nervousness, indigestion, etc. They may be subject to recurrent colds and infection. By proper supervision and management of their mode of living, improvement is usually noted, health restored and by delaying his diagnosis the physician safeguards himself and renders justice to his patient. (b) Neurasthenia.—These exhibit a predominance of nervous symptoms which may be an expression of tuberculous toxemia but generally not. Irregular elevations of temperature may occur explained as being due to disturbances of the sympathetic nervous system. Prolonged observation with a regular regimen of life supplies the correct diagnosis and meets the indications for treatment. (c)



Hyperthyroidism and other disturbances of internal secretions.—The chief complaints of these patients are malaise, loss of weight, general nervousness, digestive disturbances and at times a chronic unproductive cough with thyroid enlargement. A frequent source of error in these cases is the slight elevation in temperature in the afternoon which is accentuated by exertion or excitement. Examination of these patients discloses fine tremor of the hands, tachycardia, slight thyroid enlargement, exaggerated tendon reflexes and possibly exophthalmos. The Goetch test (hypodermic injection of adrenalin) usually gives a distinct reaction.

Other conditions are hypothyroidism, and general symptoms of nervousness and disturbed nutrition seemingly associated with abnormal function of the ovarian or adrenal internal secretions. Observation, regulation of mode of living, organo-therapy, and in hyperthyroidism surgery, frequently gives satisfactory results and establishes a clear diagnosis. (d) Chlorosis.—A primary anemia in young girls which simulates tuberculosis. A close study of the blood, close supervision, rest, proper diet and prolonged observation clear the diagnosis. (e) Fever of obscure origin.—Fever constitutes the chief early manifestation of many conditions of which the focal and pathognomonic signs of symptoms are often slow in developing. Pulmonary tuberculosis is one of the most frequent of these but there are many others.

Some of the common febrile conditions with which tuberculosis may be confused are:

(1) Typhoid and paratyphoid fever.—When associated with bronchitis and its accompanying cough the early differential diagnosis is not easy. The physical signs in the lungs, however, are not definitely and persistently localized and are bilateral at the bases. Definite evidence such as positive blood culture or widal or rose spots with enlarged spleen should be had before typhoid or paratyphoid is diagnosed. (2) Malaria.—Many cases of tuberculosis are treated for malaria, which is the result of superficial study and examination. Malarial plasmodia can be demonstrated as a rule with little difficulty. (3) Influenza.—Another ready answer used by the careless physician to explain an obscure febrile attack. Continued observation, numerous sputum examinations, careful X-ray examination will in the majority of cases clear up any doubt. (4) Focal infection.—When associated with fever and mild constitutional reaction and with chest pains or sometimes cough, the differentiation from obscure tuberculosis lesions is far from easy. Teeth, tonsils, upper air passages, especially nasal sinuses, intestines and genitourinary tract are frequent offenders. In this difficult field only painstaking search will reveal the true situation. (5) Septic endocarditis.—Frequently overlooked and mistaken for tuberculosis. The murmurs of valvular disease, the irregular temperature, with or without chills, the petechiae, the enlarged spleen, leucocytosis

and finally the positive blood culture constitute the findings upon which the diagnosis rests.

In this whole group of cases exhibiting indefinite constitutional symptoms the suspicion of possible tuberculosis should be always kept in mind because of its great frequency.

## II. Cases Presenting Physical Signs in the Lungs, A Problem of Interpretation:

In this group the problems generally are more difficult because with definite lung findings the danger lies in making a definite diagnosis of tuberculosis which does not exist. Usually the physical signs are marked and the patient complains of cough with expectoration. A persistently negative sputum should arouse the suspicion that a nontuberculous lesion is present because extensive pulmonary tuberculosis with persistently negative sputum is very rare. The X-ray is exceedingly valuable in this group giving information unobtainable by physical examination and often establishing a certain diagnosis.

(1) Emphysema and chronic bronchitis.—A very common condition that is confused frequently with phthisis. The history of cough of long standing, worse in the winter, with attacks of asthma not infrequent, is suggestive. The chest findings are usually bilateral and wide-spread, having a predilection for the bases and varying in extent from day to day. Tuberculosis is not infrequently associated with this condition being masked by it. Careful sputum and X-ray examination are the two most important diagnostic aids to use.

(2) Subacute or chronic bronchopneumonia or peribronchitis. An interesting and common group, especially since the influenza epidemic, which is frequently mistaken for tuberculosis. The symptoms are mild. Cough and expectoration marked frequently hemoptysis. The physical signs are similar to those of tuberculosis infiltration but as a rule in the bases. Repeated sputum examinations, X-ray examination and the disappearance of signs and symptoms more quickly than tuberculosis would do, differentiates the condition from phthisis.

(3) Bronchiectasis.—The physical findings though usually in the lower lobes posteriorly may sometimes be in the upper. The signs may give evidence of pleuritic adhesions, consolidation, localized bronchitis or rarely a definite cavity. The history of chronic cough and profuse expectoration; negative sputum and a fairly typical X-ray picture with the above mentioned physical findings make a very definite clinical picture but one which is not infrequently confused with tuberculosis.

EVERETT K. GEER.

CAN THE GALL-BLADDER, BILIARY DUCTS, AND LIVER BE MEDICALLY DRAINED? B. B. Vincent Lyon (*Amer. Jour. of Med. Sc.*, Oct., 1920.) This is the fifth of a series of papers on the gall-bladder, devoted especially to some of the aspects of

diagnosis and treatment of cholecystitis and cholechochitis by a method of physiologic drainage. In his previous papers, the author has described the details of his method, the drainage of the biliary system by means of duodenal catheterization and the application of a 25 per cent solution of magnesium sulphate to the duodenal mucosa. He reviews the anatomy and physiology of the biliary system, and the clinical-pharmaceutical action of the magnesium sulphate on which the rational use of his method is based. He reviews also the diagnostic possibilities of this method, and urges its adoption by the medical profession in the interest of more accuracy in the diagnosis of gall-bladder disease.

As a result of a rather intensive study of 309 patients, upon whom he has performed a total of 2240 biliary drainages, he concludes that the gall-bladder has a definite function, that of acting as a reservoir for the bile secreted by the liver, and of furnishing the same in concentrated form and in appropriate dosage to the duodenal mucosa, in response to the stimulation of the same by especially the fats, proteoses and peptones of the gastric chyme. This is emphasized as he deplores the present day tendency to the frequent unnecessary operative interference for drainage or removal of the gall-bladder, thus subjecting the patient not only to unnecessary operative procedure, but also to the later disturbing influences of a continuous flow of bile into the duodenum. He proposes his method of drainage, not to supercede the very necessary surgery—i. e. for removal of calculi, for the drainage of acute or chronic empyema, or for the relief of mechanical obstruction, but rather as an alternative method of treatment of many types of gall-bladder and duct disease, in which there arises a question of opinion as to whether surgery is or is not emphatically indicated. He points to its use for the relief of biliary stasis, especially in its early states as evidenced clinically in the various forms of "biliousness", on the basis that it is biliary stasis that is the forerunner of inflamed and infected gall-bladders and gall ducts, and eventually of gall stones. It is for the purpose of prevention of gall-bladder disease and its sequelae, by attacking this biliary stasis, that he urges the adoption of his method, rather than for the correction of full blown stages of formed calculi and active catarrhal infection.

One striking instance of the practical use of this method of drainage is cited, that of the convalescent typhoid whose stools persist in showing the typhoid bacillus, and who must, therefore, be retained as a typhoid carrier. The possible etiological relation between typhoid and cholecystitis has long been recognized. The author believes the presence of the typhoid bacillus in the stools may be due to gall-bladder infection, that this again results from biliary stasis with secondary typhoid infection, and that much can be done to clean up a typhoid carrier and prevent later gall-bladder sequelae by frequent use

of this non-surgical drainage of the gall-bladder. He likewise advocates its use as a supplementary method of postoperatively continuing the surgical principles of drainage in those cases incompletely cured by surgical measures alone. Selected case reports are given to present the merits of his method of treatment.

L. S. YLIVISAKER.

**PARALYSIS OF THE LEFT RECURRENT LARYNGEAL NERVE ASSOCIATED WITH MITRAL STENOSIS:** Joseph Garland and Paul D. White (Arch. of Int. Med., Sept., 1920.) The writers believe that this association is more common than is ordinarily recognized. It was first described by Ortner in 1897. Including Ortner's cases, 61 cases of a similar nature have been described since that time. Garland and White's report is based on 9 additional cases.

The anatomical etiology has been the subject of a good deal of discussion, the most common view being that it is due to pressure of the enlarged left auricle on the left recurrent laryngeal nerve. Fetterols and Norris have shown that direct compression of the auricle on the nerve is practically impossible, and believe that it is due to the nerve being squeezed between the left pulmonary artery and the aorta or aortic ligaments. The paralysis is due probably to a pressure neuritis rather than an actual destruction, although Ortner's 2 cases showed distinct atrophy.

In several instances the first symptom complained of by the patient on consulting the physician was the accompanying hoarseness, leading later on to the discovery of the mitral stenosis. Garland and White believe that the pulmonary artery must be the immediate factor that is causing the pressure, and are also inclined to concur with Lian and Marcocelles that a thrombosis or a mediastinitis may occasionally be the responsible factor. Auricular fibrillation may be an important additional agent, as when this occurs the auricle remains ballooned out and the production of thrombi is favored. In the differential diagnosis of factors which may produce this laryngeal nerve paralysis, an autopsy is often necessary, as aortic aneurysm, syphilitic mediastinitis, and trachial or bronchial gland enlargement, oesophageal cancer, and infectious or toxic neuritis must be ruled out, the X-ray, however, being a valuable aid in the differential diagnosis.

Garland and White report 9 cases in detail, occurring in the Massachusetts General Hospital, in the past 8 years. In 2 of the cases there was a difference also in the size of the pupils, the right being larger than the left. Four of the cases showed auricular fibrillation. Duration of the hoarseness or aphonia in the cases seen at this hospital varied from 5 days to 10 months. There were occasional remissions. They believe this condition is frequently overlooked clinically and the relationship with mitral stenosis not considered.

F. J. HIRSCHBOECK.



## SURGERY

### SUPERVISORS:

E. MENDELSSOHN JONES

LOWRY BLDG., ST. PAUL.

VERNE C. HUNT,

MAYO CLINIC, ROCHESTER.

**DIAPHRAGMATIC HERNIA:** Arthur Dean Bevan (Arch. of Surg., July, 1920.) Roentgen ray examination of the stomach and intestine, after the use of barium solution, has shown that diaphragmatic hernias are much more common than was formerly supposed to be the case.

The author classifies these hernias as: (1) congenital, (2) acquired, and (3) traumatisms of the diaphragm from stab wounds, gunshots, and so forth, with resultant traumatic hernia.

Congenital hernia occurs at the weak points in the diaphragm; that is, at the juncture of the ensiform process and costal cartilages, between the psoas muscle and ribs posteriorly, at the esophageal opening, and the opening for the venae azygos and the phrenic nerves.

The author reports in full four recent cases of diaphragmatic hernia of the acquired type. These hernias occur almost always at the esophageal opening. The development of acquired diaphragmatic hernia is considered parallel to the development of inguinal hernia; the peritoneal sac first makes its way through the opening, followed, because of increased intra-abdominal pressure, by some of the abdominal viscera. Diaphragmatic hernia practically never occurs on the right side on account of the position of the liver; the viscera that pass through the esophageal opening are those of the left abdominal cavity in the following order of frequency: stomach, great omentum, transverse colon, and small intestine. The clinical picture of a diaphragmatic hernia involving the stomach may be indefinite; it may simulate ulcer, pyloric obstruction, or disease of the gall-bladder, while hernia of the colon may present symptoms of intestinal obstruction. The definite diagnosis is made by x-ray examination.

In the author's operation for the repair of diaphragmatic hernia, wide exposure is obtained through a large "S" shaped incision on the left as employed for splenectomies. The contents of the hernial sac are pulled down into the abdominal cavity, and the hernial opening is closed by snug approximation of the pillars of the diaphragm and the esophagus, with interrupted sutures of catgut. To add additional security, the stomach may be sewed to the diaphragm or to the parietal peritoneum. Illustrations show the steps in the operation.

The ages of the patients were: fifty-seven, fifty-five, forty-one, and forty-nine, with symptoms of three years', ten weeks', five years', and three years' duration, respectively. In all the cases, symptoms were referable to the stomach. The contents of the hernial

sac in the first case consisted of a large part of the stomach and some omentum, in the second case of about half the stomach, in the third case of the great omentum and transverse colon, and in the fourth of a large part of the stomach and its omentum.

All the patients made a good recovery except one. The necropsy in this case showed a papillary carcinoma of the splenic flexure of the colon, with complete occlusion of the bowel.

V. C. HUNT.

**LUNG ABSCESS FROM A PRACTICAL SURGICAL POINT OF VIEW:** Wyman W. Littermore, (Surg. Gyn. and Ob., Vol. 31, No. 2, pp. 144-147). In the author's experience, the most common cause of lung abscess has been aspiration of blood or infected matter during or following operations on the nose and throat and the extraction of teeth. The next most common cause is bronchopneumonia.

The most common conditions in which a differential diagnosis must be made are lung abscess, bronchiectasis and a small encapsulated or interlobar empyema.

The author emphasizes the importance of the history, sputum examination, x-ray examination, and physical examination. He considers examination of the sputum very important, stating that several examinations are necessary in order to exclude tuberculosis, and also that the finding of large numbers of influenza bacilli makes the diagnosis of bronchiectasis practically certain. The x-ray is important as it is the means of making the diagnosis in many cases, and definitely localizes the process. The physical examination is of the least importance on account of the indefinite findings.

The author states that, as a general rule, all patients with lung abscess should be operated on unless there is some good definite reason for not doing so; however, from 6 to 10 per cent will recover without an operation. The use of the long aspirating needle as a diagnostic means is advised against, since the process may be localized by x-ray and physical signs. If the abscess is not discovered by aspiration, operation should not be abandoned. The dangers of infecting the pleural cavity by the needle in the event of withdrawing pus from the abscess through an area in which the visceral and parietal pleurae are not adherent, and the puncture of a large vein, with resultant hemorrhage, are pointed out.

The two-stage operation is the safest, but the abscess is not always found by this method. A window is opened down to the pleura, and if the lung and costal pleura are not adherent they are made so by suture or gauze left in place two to three days. Making a pneumothorax, however, is one of the dangers of suturing. At the second stage, two or three days later, the abscess is drained through the area prepared at the first operation. The majority of abscesses are nearer the periphery of the lung than the root, and there the lung and pleura will

usually be adherent. In deep seated abscesses, the lung and pleura have not been found adherent. In a one stage operation, the general pleural cavity is walled off with gauze and the abscess opened. The author drains the abscess with a rubber tube and places a cigarette wick down to the pleura. Three of the twenty-one patients with lung abscess recovered, and one died without operation. One of the seventeen operated on died of lobar pneumonia on the opposite side.

V. C. HUNT.

**STUDIES IN BONE TRANSPLANTATIONS. AN EXPERIMENTAL STUDY OF THE COMPARATIVE SUCCESS OF AUTOGENOUS AND HOMOGENOUS TRANSPLANTS OF BONE IN DOGS:** B. Brooks and W. A. Hudson (Arch. Surg., 1920, 1, 284-309). Extensive clinical and experimental study has given a clear understanding of the steps to ultimate success or failure of autogenous bone grafts. Knowledge of the homogenous grafts is limited and, because of the unsuccessful results following homogenous tissue grafts, they have not been considered favorably.

In this study the author has undertaken to determine the proportion of permanently successful transplants of homogenous bone and the influence of the age of the donor and recipient on the successful termination of the operation.

Dogs were used in the experiments described in this article and, when possible, were operated on in pairs, a young and an old one together. A segment of each ulna was removed from each dog and replaced respectively by an autogenous and a homogenous graft. The bone transplant was later studied macroscopically and microscopically. A saturated aqueous solution of sodium alazarin sulphonate was injected in some cases as a vital stain. The animals were classified as young, adult, and old, their age being determined by a study of the lower epiphyseal cartilage of the femur.

**Results of Autogenous and Homogenous Transplants In Dogs**

|                      | Number<br>of Cases | Successes | Failures | Per cent<br>Successes |
|----------------------|--------------------|-----------|----------|-----------------------|
| Autogenous . . . . . | 33                 | 28        | 5        | 84.8                  |
| Homogenous . . . . . | 43                 | 33        | 10       | 76.8                  |
| Total . . . . .      | 76                 | 61        | 15       | 80.2                  |

There were 31 cases of autogenous and homogenous grafts in the same animal. In one instance both grafts failed; in 4 the autogenous grafts failed; in 5 the homogenous grafts failed. There was no difference in the growth in 10 of the remaining 21 cases; the autogenous graft regenerated more bone in 8; and in 3 the homogenous grew better. It would seem, therefore, that homogenous transplants of bone are less likely to succeed than autogenous transplants, but there was no indication of absorption of the grafts.

According to the age the autogenous graft was

successful in the young, 100 per cent; in the adult, 83 per cent; and in the old, 57 per cent.

The homogenous graft was successful when the donor was young in 73 per cent, when adult in 83 per cent, and when old in 80 per cent. It was successful when the recipient was young in 81 per cent, when adult in 72 per cent, and when old in 80 per cent.

The author concludes that bone defect may be repaired by homogenous grafts in proportion of 76.8 per cent as compared with 84.8 per cent of successful results in autogenous grafts. The age is a factor in determining the success, but is probably of less importance than factors of incompatibility of tissue of different animals.

J. I. MITCHELL.

**END RESULTS OF HALLUX VALGUS OPERATIONS—A REPORT OF NINETY-SIX CASES AT THE ORTHOPEDIC CLINIC OF MASSACHUSETTS GENERAL HOSPITAL SINCE 1905:** H. W. Spiers (Jour. Amer. Med. Assoc., 1920.) Operations for Hallux-Valgus are so often unsatisfactory that the author endeavors to review ninety-six cases to arrive at a satisfactory method of treatment.

The most frequent operation for Hallux-Valgus in his series was resection of the head of the metatarsal bone, and of this series of seventy-eight, 61 per cent were satisfactory.

There were eight operations of removal of exostosis only, with 75 per cent failures.

Kellar method of operation in seven cases, all were satisfactory. He states in his opinion that the cause of failure in complete excision was the loss of the foundation of the weight-bearing pillars of the transverse arch of the foot.

Metatarsalgia and painful plantar callosities were a frequent source of trouble.

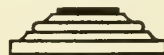
Again, partial ankylosis was frequent. Lastly, spur formation was often seen. Relief was short-lined when only the exostosis was removed.

The author strongly recommends the Kellar operation for bunions which consists briefly in an inverted U incision, avoiding the bursa, removing the exostosis and a good portion of the dorsal surface of the head of the first metatarsal, subperiosteally and an excision of the proximal end of the proximal phalanx for sufficient distance of the correct alignment easily.

This method preserves the cartilages of the joint in the weight-bearing surface and gives correction to the deformity, by shortening the toe, removing the exostosis and interfering but little with the muscular attachments.

The cosmetic and functional results in all cases have been good when this operation was used.

CHATTERTON.





## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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ALBERT G. SCHULZE,  
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**THE SIGNIFICANCE OF SYPHILIS IN PRENATAL CARE AND IN THE CAUSATION OF FETAL DEATH:** J. Whitridge Williams (Bul. Johns Hopkins Hosp., Vol. 31, No. 351.) The early aims of prenatal care were: 1. Recognition and treatment of toxemia to prevent eclampsia, 2. Supervision of the mother to avoid premature labor or other accidents, 3. Encourage maternal nursing. In 1915 the author reviewed 700 fetal deaths including all which occurred during the last 12 weeks of pregnancy and 2 week postpartum) in the last 10,000 delivered at the Johns Hopkins Hospital. Twenty-six per cent were due to syphilis, or more than to any other single cause. Since that time routine Wassermann tests were done on all expectant mothers and treatment instituted wherever possible.

The present report covers 302 fetal deaths in 4,000 confinements, of which 1,839 were white and 2,161 were colored. Positive Wassermans were found in 2½ per cent of the whites or one in 40, and in 16.29 per cent of the colored or 1 in 6. Of the 302 fetal deaths there were 99 white and 203 colored.

Syphilis caused 34 per cent of the deaths, systocia 15.20 per cent, toxemia 11.55 per cent, prematurity 10.59 per cent, unknown, 8.61 per cent, placenta previa 5.28 per cent, deformity 3.64 per cent, miscellaneous 10.69 per cent. The loss from syphilis did not include some cases which were doubtful but could not be proven at autopsy but this factor caused nearly as many (24 per cent) deaths as dystocia, toxemia, and prematurity (37 per cent). The incidence of syphilis was much higher in the colored than in the white babies; i. e. .45 per cent and 12 per cent respectively. In the whites however it caused more deaths than any single cause except accidents at labor.

The results show conclusively the benefits derived from treatment of the mother. There are three groups of cases: 1. No treatment, 107 cases with 52 per cent stillborn or syphilitic babies, 2. Insufficient treatment, 2 doses salvarsan, 103 cases, with 37 per cent stillborn or syphilitic babies, and 3. Satisfactory treatment salvarsan and mercury, 163 cases with 7.4 per cent stillborn or syphilitic babies.

ARCHIBALD L. McDONALD.

**PUERPERAL SEPSIS AND ITS TREATMENT:** R. S. Titus (Boston Med. and Surg. Jour., Vol. 183, No. 13, p. 371.) This is an excellent presentation of the modern conception of this subject. The author

explains the so-called "Autogenous infections," i. e. those which occur in women delivered spontaneously with no known source of extraneous contamination, as due to two causes. 1. Abnormal character of the vaginal bacterial flora at the time of delivery. 2. A focus of infection outside of the pelvis. He considers puerperal sepsis a wound infection and makes interesting comparisons on that basis. He recognizes three types. 1. Hemolytic streptococci with little or no local reaction and hence there is no indication for intrauterine treatment. Therapy is limited to constitutional measures. 2. The pyogenic organisms with more local reaction and later general septicemia. He describes pathology in the uterus and objects to any active treatment except to secure drainage of a definitely localized process. The clinical course of various forms of infection with possible types of extension are well described. 3. Putrefactive saprophytes which are constant inhabitants of the vagina, and are active in dead matter, retained secundines or bloodclots. This is not a serious form of infection and the author sees no indication for active local treatment except in case of hemorrhage.

In general he marshals the evidence against intrauterine therapy in all forms of puerperal sepsis and pleads for more active constitutional supportive therapy.

ARCHIBALD L. McDONALD.

## PEDIATRICS

### SUPERVISORS:

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ROY N. ANDREWS,  
MANKATO CLINIC, MANKATO.

**PNEUMOCOCCUS PERITONITIS IN INFANCY OR EARLY CHILDHOOD:** Paul W. Beaven (Amer. Jour. Dis. of Child., Oct., 1920.) Pneumococcus peritonitis is a rather rare disease among infants and young children. The great majority of the patients are under two years of age. The pathology of the peritoneal cavity. Very early in the disease it forms many adhesions which sometimes wall off, making localized abscesses. The source of infection is undoubtedly through the blood stream. From the study of our cases it appears that among the young children the source is mostly from the lungs. It is possible that pneumococci enter through the respiratory tract and that they may enter the blood stream without localizing in the lungs.

There are two types of cases. The first are those which are clearly secondary to pneumonia or an empyema and the second are those that are apparently primary. The onset of the first may be unattended by any definite symptoms and nothing be apparent until the abscess is localized in the abdomen. The

onset of the second is characterized by symptoms so acute as to immediately overwhelm the patient.

From the first group the usual course was as follows:

The onset was not marked by any definite symptoms. Previous to the time when extension was first noticed there was no tenderness, rigidity, pain or vomiting. At the time of localization there is modified fever, some enlargement of the abdomen and there may be attacks of vomiting. The rather rapid process of the disease differentiates it from tuberculosis peritonitis.

In the second type it is rare for the patients to recover. The abrupt and stormy onset differs from the very similar condition caused by the streptococcus. In acute appendicitis the symptoms are not as marked and there is more localized tenderness. The treatment is a debated point. Most surgeons believe that the abdomen should be opened. In the cases here reported nothing was gained by opening the abdomen. The pathology suggests the form of treatment, that is, as soon as a localized abscess is formed it should be opened.

R. N. ANDREWS.

**THE CALCIUM METABOLISM OF PREMATURE INFANTS:** Bengt Hamilton (Amer. Jour. Dis. of Child., Oct., 1920.) The calcium metabolism of premature infants has hitherto not been studied systematically. Such a study is, however, well justified by the fact that these infants are more liable to acquire rachitis than full-term babies. About 85 per cent of the body's calcium at birth is stored during the last two or three months of fetal life. A premature birth means that the body is exposed to postnatal life containing a proportionately very small amount of calcium. It has been surmised that this fact may be at least partially responsible for the prevalence of rachitis among the prematures. According to our present state of knowledge, however, rachitis and calcium starvation are not identical conditions. It might be possible that the assumed calcium starvation of the prematures would in some way make them more susceptible to rachitis. But there is also another possibility, namely, that some of the so-called rachitic symptoms of the prematures have nothing to do with rachitis, but are symptoms of simple osteoporosis.

One peculiarity of rachitis in prematures is the very early appearance of craniotabes. This develops to a much greater extent in prematures than in infants born at full-term. It is noteworthy that this excessive softening of the flat bones of the skull is often found in breastfed prematures in the best hygienic conditions, who are healthy and gaining rapidly in weight. The predisposition of prematures to acquire rachitis, however, can hardly be denied altogether.

In some experiments it was demonstrated that in

those periods where the intakes of calcium exceed 200mg., the retentions are sufficient, that is, as large as in normal infants, while in the periods where the intakes are lower than this amount, there was sufficient retention only in one case. It is tempting to draw the conclusion that the intake must exceed a minimum of 200mg., if sufficient retentions are to be attained. The calcium is excreted mainly in the stools.

Lindberg's experiment where an infant was alternately fed with ordinary breast milk and breast milk enriched with fat, demonstrates that a high fat intake may in the breast fed infant lead to temporary losses of calcium. Holt and his co-workers in their work on calcium and fat metabolism in bottle fed infants found no constant relation between calcium and fat excretion. The work of Lindberg on the other hand demonstrates that in a breast fed infant with abnormally high fat intake such a relation may exist. This may be explained in this way, that in breast fed infants the same relation is found when the fat absorption is low.

In this discussion an attempt has been made to find a plausible nonrachitic cause for the low calcium retention in prematures. At present, however, the available facts are neither numerous nor complete enough to justify the drawing of definite conclusions.

R. N. ANDREWS.

**RECENT PROGRESS IN PEDIATRIC SURGERY:** C. G. Buford (Surg., Gyn. & Ob., July, 1918). A very high fatality which prevails following surgical operations on infants and young children is the strongest evidence that one has something more to think of than to anaesthetize a baby and skillfully perform an operation. The author states that it is not well to deplete these patients with cathartics or to leave a baby too long without food either before or after operation. One must never hurry into operations of convenience without being sure that the child's digestion and present state of nourishment is as good as it can be made. The period of anaesthesia and the amount of anaesthetic should be reduced to a minimum. Because of blood changes ether is much better than chloroform.

The matter of allowing the oozing of blood to continue during operations on babies is a serious thing. Every drop of blood lost counts far more against an infant's prospects for recovery than it does in later life. About eight per cent of the adult body weight is blood, while in the newborn it is about five per cent. In adults, when five of this eight per cent is lost, the patient is pretty certain to die. Should a baby lose the same percentage it is totally exsanguinated. The amount of blood of babies lost at operation is usually underestimated. Children should be carefully watched and when necessity presents itself direct or indirect transfusion must be used. Hypodermoclysis and transfusion with normal salt are not satisfactory in young children.



Helmholz has shown the ease with which indirect transfusions of citrated blood may be made through the longitudinal sinus when the anterior fontanelle is open.

Intracranial hemorrhage of the new born is being diagnosed with increased frequency. It is becoming distinctly a greater surgical affection.

In view of the increase in popular recognition of different types of acute bone lesions, there is evidently more need than ever of making roentgen plates of bones in children. Scurvy and bone syphilis are bone lesions which are often revealed where they were not suspected. Osteomyelitis in children is usually demonstrable by x-ray plates.

Among the abdominal surgical affections of infancy, that of congenital pyloric stenosis for the present exceeds all others in surgical interest. The Rammstedt is very popular and in performing the same the greatest care must be taken not to puncture the mucosa; an accident which has occurred repeatedly in the hands of some of the best workers. The afterfeeding is important and should be directed by a pediatrician.

ROY N. ANDREWS.

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## ROENTGENOLOGY

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### SUPERVISORS:

C. U. DESJARDINS,  
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**THE TREATMENT OF ANGIOMATA WITH RADIUM:** William S. Newcomet (*Amer. Jour. Roent.*, July, 1920). The use of radium should be the ideal method for the destruction of all nevi. The high radiation penetrates the tissues causes an inflammatory reaction, and a certain number of cells scattered throughout the tissues are destroyed. The author does not advise the use of radium in the destruction of small nevi or superficial hemangiomas and the thin pigmented mole. Radium performs its greatest mission in hemangiomas with large vessels which extend deeply into the tissues in the neighborhood of large nerves and important structures that cannot be destroyed. The earlier the angiomas are treated the better will be the result.

He insists that a standard technique is absolutely essential. The amount given is about an erythema dose. It is better to under estimate it rather than to produce reaction that results in ulceration. If the nevi are deep, the applicator is placed from 3-6 cm. away and moved frequently to produce "cross-fire" effect. But in the more superficial types the applicator is placed 1-3 cm. skin-distance. Remembering the rules of radiation the applicator should be elevated from the skin to such a distance that by the number of movements the deep part of the nevus will

receive about the same amount of radiation as the more superficial structures. Greatest care should be taken with the skin that adjoins the nevus, particularly if it ends abruptly. It will be found many times more sensitive and will break down while the vascular tissues appear to be unharmed.

In a list of about 200 cases of angiomas of all forms, 5 died, 2 were infants with two large hemangiomas, 2 women and 1 man proved to be types of sarcoma, 86 were selected for treatment with radium, and of these 7 were failures and 17 disappeared from observation. The result in 62 cases was all that could be desired with very little scarring and after effects.

R. G. ALLISON.

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**DUODENAL DIVERTICULA:** Edmund J. Spriggs (*Brit. Jour. of Surg.*, July, 1920). In the last thousand consecutive x-ray examinations of the alimentary tract made at Duff House with an opaque meal, diverticula of the duodenum have been noted ten times. Although such diverticula are uncommon, the shadows they cast on the screen or plate may cause confusion unless their nature be recognized, and they may in rare instances give rise to symptoms. The literature shows the commonest situation is the second part of the duodenum. More than one diverticulum may be present, but they are most frequently single, and to find more than two is rare. The site of 57 cases reported in the literature were, 11 in the first part, 2 in both first and second parts, 41 in the second part, and 3 only in the third.

The size varies from a linseed to a hen's egg. The mouth of the diverticulum is frequently wide. The structure is that of the duodenal mucous membrane, with the muscularis mucosal, and frequently some fibres, often atrophic, from the outer muscular layers.

As a rule duodenal diverticula are harmless, no doubt because they drain easily from the wide openings. All the ten cases reported by Spriggs were single diverticula. Five were in the second, and five in the third part of the duodenum. One case was observed at operation. In two of the other cases the duodenum had been examined by a surgeon, but the diverticulum had not been detected. In nine of the cases the symptoms were not connected with the diverticula. In one case, still under observation, this point is doubtful.

R. G. ALLISON.

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**A METHOD OF APPLYING RADIUM IN CASES OF OESOPHAGEAL CANCER:** P. P. Vinson (*Surg. Gyn. and Obst.*, Sept., 1920). The majority of patients who come under observation have had such restricted diet that they are very weak, and it is advisable to dilate the stricture forcibly so that food may be taken before treatment is begun. Treatment is not attempted on any patient who has complete oesophageal closure, and who is unable to swallow

the silk thread which is so necessary as a guide in oesophageal instrumentation.

The patient first swallows 4 or 5 yards of silk thread, button hole twist. With this as a guide a plain olive on a whalebone staff is passed down to the stricture, and the distance of the obstruction from the incisors is carefully noted. The dilating olives are then used, being guided on the thread by a flexible wire spiral. After the dilation has been carried to 40 or 50% the patient is urged to take fluids and semi-fluid foods for several days before treatment is begun. Following this, the radium exposures are begun by the aid of the apparatus devised by Plummer.

The main portion of the apparatus is made of brass. It consists of a narrow chamber and walls 1 M. M. thick. This chamber is 7 M. M. wide and 4 C. M. long, and in its cavity is placed the radium. The lower end of the chamber screws into a dilating olive which will pass the stricture. The upper end of the chamber is continuous and a brass knob about 55 F. in size. The upper end of the knob has an opening which a whalebone staff fits, rather snugly, but not too tightly. At its margin are two small perforations, through which is passed a double heavy fish line.

The apparatus is passed down the oesophagus, guided by the swallowed thread until the dilating olive passes the stricture, and the brass knob lies above the stricture. Thus the chamber holding the radium remains in position at the site of the stricture for as long as is desired. The staff pulls out and the long fish line is left hanging outside the mouth. When it is desired to discontinue the exposure, the instrument may be displaced upward by firm, slow pulling of the heavy thread. The first exposure is usually of 3 to 4 hours, and later exposures are from 14 to 16 hours, using 50 G. M. radium salt, or its equivalent in emanations. About three exposures are used at the present time, in addition to the Coolidge tube treatment.

R. G. ALLISON.

**X-RAY STUDIES IN GOUT:** E. D. McCarty (Amer. Jour. of Roent., Sept., 1920). Radiographic studies of the hands and feet of gouty subjects have been made by Huber, Drinberg, Strangeway, Jacobsohn and others. With the exception of Huber and Strangeways all authors have considered certain radiographic findings to be pathognomonic evidence of gout. The present study was made for the purpose of attempting to determine whether the diagnosis of gout was justifiable upon the basis of the findings of these investigators. For this purpose the plates of the hands and feet of nine cases of tophaceous gout have been studied.

The author gives in detail the protocols in these nine cases and draws the following conclusions:

The soft tissues may or may not show nodular

thickening (tophi). These may be small or very large. The bones may show general atrophy, which process may be evenly distributed, or it may be irregular in its distribution. There is a marked tendency for the process to be symmetrical. In the arthritic variety the changes are both proliferative and destructive. The proliferative changes occur about the joints and along the shafts of the bones near the ends. They often appear as small knobs—exostoses (Bruce's nodes). Spur formation also occurs at the attachments of the tendons and ligaments. Destructive changes occur in the joints and are shown by narrowing and obliterating of the joint spaces and irregularity of the articulating surfaces. These joints resemble those seen in chronic infectious arthritis.

Another destructive process is the punched-out areas of decreased density. These are found in the heads of the first metatarsal bones, the bones of the wrist, the head of the ulna and radius, and in the bones of the phalanges. In the region of tophi the bones show proliferative changes and the punched-out areas of increased density, or there may be no visible changes.

For purpose of comparison radiograms of the hands and feet of 100 consecutive cases of non-gouty arthritis were studied. Among these 100 cases there occurred all the types of arthritis and also the punched-out areas of decreased density, similar to those which had been found in gout. The punched-out areas of decreased density were found in 13 of the non-gouty cases. From these findings it is evident that there are no radiographic findings in the hands and feet which are diagnostic of gout. But the types of arthritis described as occurring in gout and the punched-out areas of decreased density are changes very suggestive of gout.

The similarity between the bony changes found in the radiograms in gout and in the chronic non-gouty arthritides indicate the possibility of a relationship in the etiology of the two conditions. In this connection it is interesting to note that Magnus-Levy states that a certain number of cases diagnosed as non-gouty arthritis are very probably actual gout. This conclusion was based on metabolic studies. Furthermore, Nichols and Richardson found sodium urate deposits on the articular surfaces of the bones of the knee joint in certain cases which were clinically arthritis deformans.

R. G. ALLISON.

**COMPRESSION FRACTURES OF THE VERTEBRAL BODIES WITH DELAYED SYMPTOMS—(KUEMMEL'S DISEASE):** Robert H. Baker (Surg. Gyn. and Obst., Oct., 1920.) Kuemmel in 1895 presented 5 cases of this type of spinal lesion. He stated that the disease is characterized by the following features: spinal injury, with temporary symptoms of short duration and no local evidence of diagnostic importance, and subsequent delayed symptoms of



pain, disability, and local signs of bone injury, especially kyphos.

The author reports 7 cases in the hopes that some discussion may arise which will settle this problem of spinal fracture with delayed symptoms and signs. In 5 of the 7 cases x-ray examination at time of injury was negative. In the other 2 cases there was no x-ray examination at the time of injury.

The author presents the theory that there is a type of compression fracture of the spinal bodies which is apparently benign at first and gives no x-ray evidence of a bony lesion, but in which, at some later period, definite bony changes develop, and the diagnosis can be easily made by certain destructive signs including the typical x-ray picture.

He believes there remains two facts to face: either we still lack finesse in x-ray technique or fail to use it in our diagnosis; or there remains a type of spinal lesion of the nature described. He urges earliest possible diagnosis; frequent examinations, physical and x-ray, for the weeks or months following the injury. Such procedure might give us the first evidence of the coming destruction and afford us, by proper treatment, a chance to ward off actual collapse of the fractured centrum.

Note: It is the opinion of the abstracter that adequate x-ray plates of the spine made in both the antero-posterior and lateral direction, of which the lateral is the more important, and interpreted by a competent roentgenologist would disclose evidence of this type of fracture at the time of injury.

D. G. ALLISON.

## BOOK REVIEWS

**DIAGNOSTIC METHODS.** By Ralph W. Webster, M. D. Ph. D. P. Blakiston's Son & Co., Philadelphia.

This volume, a sixth edition, is most comprehensive and is amply illustrated. Since its last publication sufficient new material has been added to justify a revision of the old text. The new material consists of a discussion of the endameba gingivalis, description and methods of study of the bacillus rhinitis, Wolff-Junghan's test for gastric carcinoma, Wagner's "dry" test for occult blood, phenoltetrochlorphthalen test for hepatic activity, urease method for urea, Folin's new method for creatinin in the urine, Folin and Denis' microchemical methods for non-protein nitrogen, Benedict and Murlin's method for amino-acids in the urine, Schick diphtheria toxin reaction, Bronfenbrenner's modification of the Abderholden's test and tests of blood before transfusion.

**PATHOGENIC MICROORGANISMS.** By William Hallock Parker M. D. and Anna Wellels Williams M. D. Lea and Febiger. Philadelphia and New York. \$6.00.

The seventh addition of this work differs from the sixth in the adding of new material and the rewriting of the old. The chapter on Media has been rewritten by Dr. B. V. H. Anthony utilizing the recent work on hydrogen-ion concentrations; the sections on streptococci, on yeasts and on influenza bacilli have been extensively revised; the chapter on complement fixation has also been revised. Recent information on pathogenic bacteria affecting the respiratory system gained through the influenza epidemic and the last part of the war, with preventive measures against typhoid and paratyphoid fevers and wound infections due to anerobic bacteria have also been added. This work warrants perusal.

**TEXT BOOK OF PATHOGENIC BACTERIA AND PROTOZOA.** By Joseph McFarland, M. D. W. B. Saunders Co. \$4.75.

Professor Joseph McFarland's "Text Book of Pathogenic Bacteria and Protozoa" has now reached its 8th edition, an ample evidence of the excellency of the work. It is well written and complete in every sense. It differs from the seventh edition in that numerous alterations, subtractions and additions have been made and these to a good purpose.

**SYMPTOMS IN DIAGNOSIS OF DISEASE.** By Hobart Armory Hare, M. D., B. Sc. Eighth Edition. Lea & Febiger, Philadelphia and New York. 1920.

The appearance of the eighth edition in a relatively short time speaks quite forcibly in commending the usefulness and practicableness of such a text on physical diagnosis.

Since the laboratory procedures have enormously increased in the last few years, the author has omitted them from the work wisely stating that they



require special books. At this time when many a physician is pigeon-holing the various diagnoses by means of a laboratory, the simple practical method of carefully obtaining the subjective symptoms, of scrupulously searching for the objective findings and logically grouping these in a manner that will account satisfactorily in explaining each one in the provisional diagnosis, cannot be too highly emphasized. It is needless to say that the arrangement of the material makes this book very valuable in differential diagnosis.

This second edition (thoroughly revised) contains numerous plates and engravings by the aid of which illustrations the content of the book is frequently clarified and occasionally more readily comprehended.

There is no doubt that the eighth edition will receive a hearty welcome from all interested in symptomatology of diseases.

LEPAK.

**EPIDEMIC ENCEPHALITIS.** By Frederick Tilney, M. D., Ph. D., and Hubert S. Howe, A. M., M. D.

"The volume is primarily a collection of case reports, thirty-one in all, chosen to illustrate most strikingly both the typical and the atypical feature of epidemic encephalitis. The authors are peculiarly well qualified to speak with authority. In assembling

their material they have given in each instance a full and careful analysis of the onset, symptoms and history. This is followed by clinical, neurologic and laboratory findings, illustrated by photographs, charts and photomicrographs showing lesions in different portions of the nervous system.

"The etiological factors, course, duration, prognosis and treatment, and the typical pathological changes are described in detail.

"The symptoms and histories presented differ widely and are, in fact, often contradictory. This diversity is typical of epidemic encephalitis, and adds much to the difficulty of diagnosis. It has been the aim in this monograph to cover as far as possible the various forms in which the disease manifests itself in the hope of facilitating its early recognition.

#### **Differential Diagnosis is the Keynote of This Monograph**

"The literature has been painstakingly collated, and what is deemed a complete bibliography is appended."

The above review is taken from the Publisher's Note. It is a statement of facts and I take pleasure in quoting it. The book draws very faithfully that picture of extraordinary number and distribution of symptoms which all of us have seen, or heard others discuss, in studying cases of epidemic encephalitis.

LEPAK.



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# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### SOME OF THE PROBLEMS OF INTERNAL MEDICINE\*

JOSEPH L. MILLER, M. D.  
*Chicago, Ill.*

The only member of our profession who is satisfied with his knowledge of medicine, and who considers it a well rounded out and thoroughly understood science, is the medical graduate at the time he receives his diploma. He has studied diligently the text books placed before him and memorized the notes taken at his lectures. He has creditably passed his examinations and thus fulfilled the requirements demanded by his Alma Mater.

The graduate today has, however, a much humbler opinion of himself than did we who graduated a quarter of a century or more ago. This is due in part to his more extensive pre-medical training and in part to the changed character of his teachers. For a teacher today to admit to his students that it is impossible to explain many of the phenomena of disease, is not considered as evidence of ignorance; furthermore, a larger percentage of our teachers have taken an interest in the investigative side of medicine and thus aroused the interest of the student in its unsolved problems.

Valuable additions to our knowledge of medicine have not been contributed necessarily by the physician with extensive hospital or laboratory facilities, but rather by the alert and independent mind unwilling to abide by tradition.

The lapse of time rather than diminishing, has increased the problems in medicine. The blazing of trails has opened up new vistas with innumerable ramifications. There has never been a time in history when the problems in

medicine were so numerous and diversified and so appealing to the varied or special qualifications of all those with an inquisitive turn of mind or an interest in public service.

If we review hastily the various diseases with which we come in contact, in how many of these is our knowledge of etiology, prevention and curative treatment, reasonably complete? There is only one disease, malaria, where we can express a high degree of satisfaction with the completeness of our information. Its etiology has been definitely determined, marked progress has been made in practical preventive measures and the curative treatment well established. Yet in this disease, Bass within the past two years has shown that the customary methods of administering quinine fails in the majority of cases to eliminate the parasite. Pursuing his studies further he has determined the minimum daily dose of quinine and the length of time it must be continued in order to completely eliminate the infection.

Before discussing further the limitations of our knowledge, it might place us in a better frame of mind if we review briefly some of the large problems in medicine which have been attacked in recent years with most gratifying results.

The combating of typhoid by sanitation and protective inoculation with the saving annually of thousands of lives and millions in money, is recent history more or less familiar to all. It has been shown that epidemic typhoid is preventable. The city or community which suffers from repeated epidemics of typhoid can justly be accused of gross negligence. It is gratifying to note that there has been a steady and marked reduction in the incidence of typhoid in the cities of the United States until at present we have a record which compares favorably with that of Europe. The most striking illustration of what has been accomplished may be gathered from the prevalence of typhoid in the United

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

States Army during the Spanish American and the recent World War. The total number of cases of paratyphoid and typhoid in the entire American Army at home and over seas from August, 1917, to June 1, 1919, was only 1,418 with 158 deaths. Compare this with 2,683 cases and 248 deaths occurring among less than 12,000 troops at Jacksonville, Florida, during the Spanish American War. This has been accomplished in only two decades. A short period of time to have conquered a scourge which in previous wars has been more deadly than bullets.

Yellow fever, within the memory of most of those present, was a pest in the Southern states costing thousands of lives and inestimable economic loss. The epidemic of 1878 took a toll of 13,000 lives in the Mississippi Valley. It was a still greater plague in the West Indies. The French on the Island of Haiti were almost exterminated in 1842. During one epidemic half the population of Guayaquil in Ecuador was sacrificed. It was largely responsible for De-Lesseps' failure to complete the Panama Canal. For years its presence in South America had been a menace to commerce. When the United States acquired Cuba, they received gratis a hot bed of yellow fever. Proper development of the Island was impossible until this disease was brought under control. A group of army officers were selected with Dr. Walter Reed in charge to study the manner of dissemination and means of exterminating the disease. Their method of attacking this problem should serve as a model for constructive scientific investigation. They definitely determined that a certain species of mosquito was the sole carrier of this disease. By destroying the breeding grounds of the mosquito and carefully protecting the sick by screening, they were soon able to reduce greatly its prevalence and by following up these methods, yellow fever has finally been eliminated from Cuba. The application of the knowledge gained by this small group of medical men, made possible the construction of the Panama Canal. In recent years the International Health Board of the Rockefeller Foundation has extended this war against yellow fever and in many of its strongholds in South America it has been completely exterminated. Noguchi, working with this Foundation, has recently discovered the specific microorganism and prepared a serum

with both protective and curative properties. The recent death of General Gorgas prevented him from "writing the last chapter of yellow fever."

A very important campaign has been carried on for several years by this same Board in combating malaria. In the North we are prone to consider malaria as a rather unimportant disease. Throughout the world, however, 800,000,000 people live in tropical and subtropical regions where malaria is more or less prevalent. In India alone it is computed that 1,300,000 die annually from malaria. In our Southern states not only is malaria responsible for many deaths, but it lowers the efficiency of a large group of individuals and has prevented the development of large areas of tillable land. The Rockefeller Foundation selected for their educational campaign several towns in Arkansas. They were able to show that the incidence of malaria could be reduced almost 70 per cent at a per capita cost of sixty cents. This was accomplished by destroying the breeding places of the mosquito, by proper screening and through the use of immunizing doses of quinine.

Bubonic plague during the last quarter of a century has been brought to our shores repeatedly, especially on the Pacific and Gulf Coasts. It is highly probable if this had occurred fifty years ago, it would have developed into a widespread epidemic. Thanks to our knowledge that the rat and gopher harbor the germ, it has never been able to obtain a foothold.

We are all familiar with the hookworm campaign in the Southern states and some of the islands of the West Indies. Ninety per cent of the inhabitants of Porto Rico were infected with this parasite. By means of educational campaigns this disease is gradually being brought under control.

Intensive studies have been made in many other diseases, but up to the present have borne little fruit. In this last, a notable example is cancer. This labor and money has not, however, been lost as it has paved the way for future investigators who, let us hope, may finally reach the goal.

Turning to the problems still unsolved, their name is legion, and to attempt to discuss them in detail would require a review of all of medicine. When we consider the long list of con-



tagious diseases we are depressed by the limitation of our knowledge. In several the etiological agent has not been discovered. Means of dissemination are still far from determined and preventive measures are still in an unsatisfactory state. We cannot boast of the value of therapeutic measures as evidenced by most of these diseases being still referred to as self limited in duration. The recent epidemic of influenza was the most serious that has ever been recorded. We must frankly admit we were helpless in preventing its spread or in treating the disease after it had developed. Even in army camps with their rigid discipline and ability to enforce every precaution, the disease entered undaunted and took its toll.

When we consider the long list of chronic diseases as chronic arthritis, nephritis, myocarditis, arteriosclerosis, hypertension, pseudoleukemia, leukemia, pernicious anemia and diabetes, we are humbled by the limitations of our knowledge. Their etiology is still hidden in mystery. Preventive measures and curative treatment are renewed only by their absence. We are valiantly struggling with these diseases and from time to time valuable acquisitions to our knowledge are recorded.

It should be strongly emphasized that the acquisition of new knowledge is not restricted to our research institutions or to the physician who has access to large clinical hospitals. MacKenzie carried on a large part of his investigations on the heart, which have made his name famous, on private patients and with little aid from hospital facilities. Corrigan in his masterly studies of aortic regurgitation had available only six hospital beds. Recall the work of Beaumont, whom Osler fittingly refers to as the "backwoods physiologist," in his observations on the stomach of Alexis St. Martin. His untiring efforts over a long period of years, without facilities and with a refractory patient should encourage each of us to do his bit. To be an investigator, it is only necessary to seek the truth. To see things through our own eyes and to record these observations accurately. Such observations must survive because they are true. Inaccuracies of observation, or distortion of vision in the effort to prove a theory, is responsible for many of the fallacies and passing fads in medicine.

It might be of interest to take stock of our actual knowledge of some of the more common diseases with the view of reminding us of its limitation.

Pneumonia, a disease responsible for 70 per cent of the deaths from disease during the recent war, is one of our medical problems. The microbic agent is usually the pneumococcus or streptococcus and possibly occasionally the influenza bacillus. Our knowledge of the predisposing agencies is still exceedingly limited. Close contact when the disease is prevalent increases the liability of infection, but all exposed contacts do not contract the disease. Exposure to cold, formerly thought to be such an important factor, has lost much of its significance, as shown by severe epidemics of streptococcus pneumonia during warm weather. At least in large cities, epidemics of pneumonia of moderate extent during the summer months are not unusual. A considerable number of other predisposing factors might be mentioned, to none of which, however, can we attach great importance. In fact, comparatively little progress has been made during the last half century in the prevention of this scourge. We were stimulated for a time to hope that protective inoculation might solve this problem, but the most recent investigations indicate the present day methods of protection are so transitory in character as to render them almost valueless. Happily, however, the future is still before us and we should not give up hope that eventually aid from this source may be secured.

In the treatment of pneumonia as shown by statistics, comparatively little advancement has been made. In drug therapy nothing of significant value has been discovered. Serum therapy is still in its infancy, but up to the present time we are forced to admit the best of the sera are of doubtful value. This rather dark picture should not lead us to lose hope that another Pasteur or perhaps some obscure physician student may discover a remedy for this dread disease.

Typhoid fever has shown a most gratifying decrease during the last quarter of a century due to the discovery of practical preventative measures. When we consider, however, the treatment of the disease we have little advantage over our forefathers. The value of the Brand method of hydrotherapy has probably

been greatly over estimated, as is shown by referring to quite extensive control statistics soon after this method was introduced. The lowered mortality in recent years is probably due at least in large part to improved diagnostic measures which enable us to recognize mild cases of this disease. The introduction of the more liberal diet has increased the comfort of the patient and probably reduced slightly the mortality. We must still admit, however, a mortality of 10 per cent and to further reduce this is one of the present day medical problems.

The chronic arthritides present practically the same difficulties from a preventative and especially from a therapeutic standpoint as they did when this disease was first described. The early hopes that vaccine therapy and removal of focal infection might offer hopes of cure or at least stop the progress of the trouble, has unfortunately not been sustained although probably of some value. He who discovers a remedy for this disease will earn the everlasting gratitude of a host of sufferers.

Chronic hypertension is another of the live problems in medicine. With the exception of a small group of cases, we are quite at a loss to explain the origin of this condition. We are still much confused as to cause and effect. It is, therefore, needless to say that preventative measures are in the purely theoretical stage. There is little or no evidence to show that diet, worry or overwork is responsible for chronic high blood pressure. Methods of treatment are equally unsatisfactory. It is probably true that certain measures may prevent or delay the complications of hypertension, but there is no method of treatment now in use that will permanently lower chronic high blood pressure.

Pernicious anemia, leukemia and pseudoleukemia form a group where our knowledge outside of pathology and symptomatology is most meagre. We know little of the etiology and nothing of prevention in these diseases. Treatment is at most merely palliative. It increases the patient's comfort and prolongs life, but does not effect a cure. Each of these diseases annually takes a considerable toll of lives and offers an excellent field for the investigator.

We might pass thus in review, many other diseases in which our knowledge is of the most primitive character. New facilities for study,

the greater ease with which money can be secured for investigation in medicine and the increasing number of well trained workers in the field, promise well for the clearing up of many of these obscure problems.

Diverging somewhat from what is ordinarily considered the science of medicine, there are other problems no less important when we consider medicine as the art of healing.

Social service, a relatively new and unappreciated branch of medicine, deserves consideration. The physician, especially in public medical service, has considered his duty completed when he has restored the individual to a sufficient degree of health to enable him to return to his daily vocation. It may have required weeks of rest in bed, nursing and medical care to restore the compensation in a patient with heart disease. All medical supervision or interest in the patient is gone when he passes through the door of the institution which has given him such excellent attention. He returns to the same employment in which he previously acquired his disability. Almost certainly within a few weeks he will again be unfitted for work, return to the hospital where he is kept for weeks until improved. This procedure is repeated until eventually even improvement in his condition is no longer possible and death relieves him of his misery and perhaps leaves his family a public charge. The duty of the social service or public welfare organization, is to secure for such a patient a position suited to his disability. He and his family are visited and instructed in the proper after care, and so secure complete co-operation at home. The majority of these patients will welcome interest of this character and when once established will be fully appreciative. This, as can readily be seen, is not merely a medical, but an economic problem. Patients with ailments where rigid dieting is necessary, can be greatly helped by instruction given to the wife or mother. The young mother needs instruction and kindly help in rearing her child, aid which must be extended much beyond the period of stay in the hospital. Dr. Cabot relates a striking instance of the limitations of medical treatment when confined to the walls of the hospital or dispensary. It was discovered on consulting the dispensary records that various members of a family had been coming to



the dispensary for more than a year to be treated for scabies. As several members of the family were infected, no sooner was one cured than he became reinfected and thus this endless chain was maintained. A few visits of a trained worker to the home accomplished in a brief period of time what the dispensary had not been able to do in a year. This may be an exaggerated example, but nevertheless much of our work is performed in this same thoughtless and inefficient manner. It is true the physician cannot be expected to perform this work himself, but he must be the moving spirit to stimulate the public to provide ways and means for carrying it on. A few hospitals have a well organized social service. Acquaintance with the patient begins in the hospital and when he is ready to leave plans are already completed as to his future care. Every community has a number of organizations of a charitable character. The duty of the social service worker is to discover the patient's needs and bring him in contact with the proper existing agencies which thus assume responsibility for his future care, whether this be securing suitable employment, a further rest in a convalescent home or the supplying of food, clothing or money to tide over an emergency. The social service department, however, still maintains an interested supervision by a follow up system. Many hospitals and dispensaries maintain an educational return clinic where at stated intervals in the evening or on Sunday, groups of former patients suffering from similar diseases may return to be looked over and talked to in regard to the precautions they should observe. These measures lead to a degree of permanency of cure not to be accomplished by other means.

Closely related to this work is vocational education or retraining of the handicapped. The importance of such training was abundantly emphasized with the disabled soldiers. Thousands of cripples from injury or disease develop every year in civil life. Such individuals, if poor, become wards of the municipality or the state. Others secure positions where they eke out a mere livelihood. A large percentage of these people, by careful selective vocational training, could at comparatively little cost not only become self supporting, but in many instances de-

velop an earning power greater than before their disability.

This is a duty which belongs to the community, municipality or state, but the physician is the individual who can and should arouse public interest in this long neglected problem. Eventually the state will probably become responsible for this work. Meanwhile the community by example can hasten the day.

In conclusion, one other subject deserves consideration and it is broached with some hesitancy. There has been, especially during the past few years, much discussion on the question of health insurance. The man of family with moderate income must figure very closely upon all his fixed expenditures as rent, clothing, and food. Perhaps his plans include laying a certain sum aside for a rainy day. Sickness is an unknown factor. He cannot determine in his annual budget the amount required for physicians' bills and perhaps hospital expense. For this reason illness finds him financially unprepared or if he has been thrifty, may easily consume several years' savings. Is it asking too much that the state should be interested in ways and means by which for a fixed sum, he or his family if ill, may be assured of satisfactory medical attention? Unfortunately in all plans now in operation, with the possible exception of certain large corporations, the sum allowed for this purpose is entirely inadequate to give the individual high class medical care. The profession as a whole, both in this country and in Europe, are opposed to health insurance in its present form as it does not give the individual the character of service which he deserves. Those members of the profession, and they make up the great majority, who are interested in the health and welfare of the people with moderate means will not oppose health insurance when they are assured that it means better attention for the sick. First class medical service is time consuming and, therefore, expensive and cannot be secured without proper compensation to the physician. Good medical care very frequently requires the cooperation of several specialists, each of whom must be adequately paid. Unless adequate satisfactory fees are provided for, this work will be performed by those least competent to earn a livelihood in open competition.

It would appear that in order to carry out

such a plan most economically, centralization is necessary. There is a plan now being considered in England which is based upon such a foundation. District zones are established each with its health center which contains laboratories, consulting and operating rooms and a small number of hospital beds. This center is the headquarters of the medical staff which includes the various specialists. In other words, it should be a well equipped and well manned out-patient department with the addition of a limited number of hospital beds. In such a scheme, much of the work now done by the physician could be performed just as efficiently by less highly trained and consequently less costly labor. Properly equipped, such a center would attract especially able young men who would thus secure an opportunity to practice medicine under satisfactory conditions. It would thus not only serve the ailing public, but would also be an educational institution for the medical profession. The innumerable details of such a plan will eventually be worked out. Difficulties and opposition no doubt will arise. Eventually, however, it is probable some plan of this character can be adopted as it is practical and not a Utopian dream. Money in large amounts will be required to properly finance any satisfactory form of health insurance. A nation which spends millions of dollars annually for the prevention and treatment of animal and plant disease, should be educated to see that human life is even more valuable and it cannot be safeguarded without liberal expenditures of brains and money.

In this brief review only a few of the problems in medicine have been mentioned. It suffices, however, to show that medicine is a living science still in its infancy and offering splendid inducements not only to the scientist, but to those interested in the large problems of public welfare.



## SOME NEW ASPECTS OF THE PROBLEM OF CANCER CONTROL\*

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Mr. Chairman, Ladies and Gentlemen:

I have been requested to take the place of Dr. Gaylord of Buffalo, who is unavoidably prevented from being present. I share your regret that we could not have heard Dr. Gaylord, who is one of the best informed experts on the cancer problem today. Dr. Gaylord has measurably advanced the cause of cancer research, as Director of the New York State Institute for Malignant Diseases, and he has brought to bear upon his work a strictly scientific attitude, indispensable in all inquiries aiming primarily at the truth and not made to substantiate some preconceived theory or point of view.

*The cancer problem* is as baffling today, if not more so, than it has ever been. The subject is becoming more ramified as research in one direction or another proceeds and as new problems arise, or new discoveries are made. No one can today lay claim to a thorough grasp of the whole subject further than in broad outlines, and even that is a task of considerable difficulty.

When the *Society for the Control of Cancer* was formed, it was clearly realized that the main objective of its propaganda should be to arouse the general public to the menace of cancer increase and the hopeful effects of early diagnosis and surgical treatment in the early stages of the disease. It was for this reason decided not to call the society one for the prevention, but rather for the control of cancer. In other words, the aim of the society is to bring about a reduction in the death rate from cancer as the results of early methods of treatment, whether surgical or otherwise. Nothing of value is known at the present time that would justify the belief that cancerous processes can be prevented; but the knowledge of pre-cancerous conditions leads to earlier diagnosis and treatment at a stage when the prognosis is generally quite favorable.

\*Read before the Minnesota State Medical Association, St. Paul, Sept. 30, 1920.



Regardless of what the society has done, and it has done much, there has not as yet been a marked effect on the cancer death rate. In some localities where the campaign has been most effective, the rate has unquestionably declined, on account of cases coming earlier to operation. But, in a general way, it may be said that the vast majority of cancer operations still take place when the disease has reached an inoperable condition. Cancer is not only one of the most important causes of death, but *the disease is increasing* from year to year in practically all civilized countries. In the continental United States it may be conservatively estimated that during the present year there will not be less than about ninety thousand deaths from malignant disease. On the basis of an earlier estimate, the approximate number of deaths from cancer is divided somewhat as follows: Stomach and liver, 32,000; female generative organs, 12,500; peritoneum, intestine and rectum, 11,000 female breast, 8,500; cancer of skin, 3,500; cancer of the buccal cavity, 3,500; and of other organs or parts 13,000; a total of 84,000. This statement illustrates the wide diversity of the cancer problem and emphasizes the importance of considering the cancer question in detail, rather than in general terms, for methods of treatment applicable to one form of cancer may be wholly inapplicable, or partly so, to another form. The statement also illustrates the great importance of accurate death certification. It is lamentable that so many certificates should be sent in containing merely the term "cancer." It obviously is of the first importance that the organ or part of the body affected should be stated, for it will not advance the cause of cancer control to deal with statistics limited to cancer mortality in general terms. It, no doubt, entails a certain amount of additional labor on the part of the doctor to fill out a certificate in detail, but by doing so much subsequent and more burdensome correspondence is avoided. The filling-out of death certificates on the part of the attending physician is a statutory duty, which requires to be discharged in full cognizance of all that is implied in the subsequent use of the certificates for legal, medical or public health purposes.

*The cancer death rate* in the continental United States has been increasing from year to year, or

at the rate of about 2.5 per cent per annum. There is no corresponding persistent increase in the death rate of any other disease or group of diseases, and considering the vast amount of useful knowledge concerning the cancer problem, the increase reflects the lamentable apathy on the part of both the public and the medical profession towards the problem of the earliest qualified diagnosis, followed by the earliest radical method of treatment. Since the propaganda for cancer control is largely limited to cities or urban communities, it will be of interest to point out on the present occasion that the cancer death rate of twenty representative American cities increased from a rate of 72 per 100,000 in 1904 to 89 per 100,000 in 1914 and to 94 per 100,000 in 1918, not all the figures for 1919 being as yet available. *This increase is real and not apparent.* In fact, the true increase in cancer liability is much greater, for operative interference has in the meantime increased materially in efficiency. If it were possible to ascertain the number of successful cancer operations during the course of a year and by means of a follow-up system, the number of successful cures within a given period of time, it would become clearly apparent that the liability to cancerous affections is possibly today 50 per cent greater than it was fifteen years ago.

The control of the cancer death rate is *primarily a surgical question*, for unless the offending mass of cancerous tissue is promptly removed in the early stage of the disease, as all of you know, death is a foregone conclusion. It would be as sensible to argue against the installation of fire-preventive apparatus as to argue against a propaganda which will increase early surgical operation. There is the utmost urgency that the number of early operations should be very considerably increased as a first step in the more satisfactory solution of the problem of cancer control.

In *Minnesota* the cancer question is of special importance, particularly in the case of the Twin Cities. The rates, in fact, are so startling that they suggest the urgency of a special inquiry into determining factors which a qualified investigation might disclose. In the case of the city of St. Paul the cancer death rate has increased from 61 during 1904, to 74 during 1914

and to 113 per 100,000 of population in 1919. The cancer death rate of Minneapolis has increased in about the same proportion, or from 58 in 1904, to 93 in 1914 and to 106 per 100,000 in 1919. The St. Paul and Minneapolis rates are considerably above the average for the country as a whole, though not as high as the rates for Boston and San Francisco. They are in marked contrast to rates as low as 59 per 100,000 for Detroit and 65 per 100,000 for Charleston.

There are no reasons for believing that the high cancer death rates of St. Paul and Minneapolis are primarily the result of hospital admissions. Probably no city in the country attracts more cancer patients than New York and yet the rate for New York City is only 92 per 100,000. But, granting that there is a liability to serious error, it is obviously of the first importance that the cancer data should be subjected to critical analysis with a due regard to the precise residence of the deceased, the duration of such residence and possible local factors determining cancer occurrence.

The statistics are also suggestive of the urgency of an aroused public interest in *cancer control in the Twin Cities*, carried persistently forward until a measureable reduction in the death rate has been secured. At the present time no other means are known to medical science than the earliest possible removal of the offending mass by whatever means may be considered best. The Society for the Control of Cancer has prepared lecture outlines for such purposes and it is to be hoped that the local committee will gain the proper support from both the medical profession and the laity to carry on its useful work. I may say in behalf of the American Society for the Control of Cancer that it will most readily cooperate in the furtherance of any method aiming at the reduction of the cancer death rate in the two principal cities of Minnesota and possibly other localities in the state likewise afflicted. I may also say in this connection that the society has found the cooperation of the churches most effective in securing a large attendance at meetings. The public is eager for the truth and willing to cooperate when the facts of cancer treatment and cure are made readily intelligible. The society aims in its public meetings to omit scientific terms not within the general understanding, while at the same time all

unnecessary harrowing details of the disease are carefully avoided. The expense of local meetings is small, while the results are invariably most gratifying. It is usually a decided advantage to have the meeting addressed by one or two speakers from a distance, to avoid the possible conflict of local interests. Two speakers are generally sufficient for the purpose and a meeting of an hour or an hour-and-a-half meets all reasonable requirements for a full statement of essential facts. The value of the meetings is increased by the use of local mortality or other data illustrating the local incidence of the disease. For this purpose I have for some years past brought together a large amount of statistical information presenting the facts with entire impartiality and as derived in a standardized manner from official records. I cannot, of course, on this occasion enlarge upon this aspect of the cancer problem, but I cannot omit to say that the cancer death rate in this country is reaching alarming proportions, corresponding to the highest rates observed anywhere in the civilized world. The tendency of the death rate is so obviously in the wrong direction that I would fail in my own duty if I did not reemphasize the supreme importance on the one hand of more qualified research into cancer causation, and on the other the practical possibility of an effective campaign for cancer control.

I have used the word "*cancer causation*" advisedly. The problem is not one of *a* cause of cancer occurrence, but of many causes and a multiplicity of conditioning circumstances. In my judgment, the research for *a* cancer cause is hopeless, for all the known facts regarding cancer occurrence clearly illustrate the wide diversity of conditions under which cancer occurs with more or less extraordinary frequency. The negative side of the cancer problem is as important as the positive side. It is as urgent that we know or understand why cancer does not occur in certain races, or in certain sections, as why the rate should be one of extraordinary and exceptional frequency. Cancer, for illustration, practically never occurs among our native *Indian tribes*, but I have yet to find the first trustworthy inquiry into the facts of a situation as puzzling as it gives promise of hopeful results. I have had an analysis made of 161 recent deaths on seven Indian reservations in the state of Min-



nesota, practically limited to the Chippewa tribe. Out of this number of deaths only four were from malignant disease, or 2.5 per cent, which compares with a normal expected proportion of about 4.5 per cent for the population at large. The Chippewas include a considerable proportion, if not a majority, of mixed-bloods. Among full-blood Indians cancer practically never occurs. I have made special inquiries among the Navaos and Zunis, but failed to find a single recorded case. But even more impressive is the result of a recent inquiry by means of a questionnaire sent out to 127 agency physicians, including practically the entire country and a total Indian population of about 115,000. Sixteen out of 71 reported no cases of cancer of the skin, twenty out of 71 reported no cases of cancer of the mouth, twenty-one out of 71 reported no cases of cancer of the breast, and thirteen out of 68 reported no other form of malignant disease. In the remainder of the reports cancer was referred to, in the large majority of cases, as of rare occurrence, and only in very few as of average occurrence, probably chiefly among tribes largely intermixed or intermarried with the white population.

Another most significant phase of the cancer problem, also generally ignored by those who should give qualified consideration to the question, is the very rare occurrence of cancer of the female breast among the *Japanese*. The rate for recent years has been not quite 2 per 100,000 of population, which compares with a rate of 15.7 for the United States registration area and of 20.7 for England and Wales. These rates are for the female population only. They indicate so decided a disparity in disease liability as to emphasize the urgency of a thorough investigation.

Wherever it is possible the facts of local cancer occurrence should not only be brought to public attention, but they should be subjected to a thorough analysis as to possible causative factors. No phase of the problem illustrates this conclusion better than the possible *influence of topography*. The most important contributions on this aspect of cancer control are the statistical studies by Mr. C. E. Green of Edinburgh, who has laid down the fundamental principle that "There are most striking topographical variations in the incidence of the disease"

and that when corrected for possible errors due to admissions to local institutions, it will generally be found that towns lying in a hollow, or in a cup formation, have cancer death rates decidedly above the average. Towns on distinctly steep or hilly sites show a cancer mortality slightly above the average, while towns lying on slopes, or on flat sites, or having flat surroundings, show a mortality below the average. These observations by Green, amplified by a mass of strongly convincing information have also failed to attract the required public attention as a new contribution to cancer knowledge. The theories of Green are somewhat involved, since the conclusions are derived partly from the occupational incidence of the disease, partly based on topographic peculiarities and partly on the influence of the fuel, or the relation of cancer occurrence to the elimination and removal of products of combustion from the houses or from the neighborhood. This ingenious theory is based partly on the true nature of chimney-sweep's cancer, in which soot or one of its ingredients is unquestionably the cause of epithelioma. It rests likewise on the theory that coal tar is a causative factor of cancer occurrence among coal tar workers who work with the actual material which induces the disease. It would carry me entirely too far to explain these theories, even in most general terms, but it will be sufficient for the present purpose to have pointed out their importance in the possible solution of the problem of cancer control in the state of Minnesota.

It affords me the utmost pleasure to be able to say that this particular phase of the cancer problem has been made the subject of an exhaustive investigation by *Dr. Georgine Luden* of the Mayo Clinic, who has presented the facts of her findings in a thesis submitted to the University of Minnesota, and which I have had the privilege to read, as well as to discuss with Dr. Luden during my recent visit to Rochester. The work of Dr. Luden is one of extraordinary promise, for the situation in Rochester is apparently precisely such as in the opinion of Green would predispose to an excessive incidence of cancerous disease. The studies by Dr. Luden have not gone far enough and there is the utmost urgency for more extended inquiries, particularly a more thorough analysis of the local mortality experience, inclu-

sive of all the residents of Rochester, since her own investigations are limited to only such as were treated at the Mayo Clinic, but she was very careful to eliminate all cases not strictly representing Rochester residents, who had not lived at least five years in the city. It is practically certain that the investigation will be continued, through the cooperation of the local Board of Health and possibly the State Board of Health, making available the mortality facts for the population as a whole. But the results thus far achieved seem to confirm in a striking manner the conclusion of Green, according to which a smoke-polluted atmosphere is a direct and measurable causative factor in cancer frequency above the normal.

It is to be hoped that further investigations will be made, for it may be questioned whether anywhere the opportunities for *scientific research at a minimum expense* are more conveniently available than at the Mayo Clinic, but Dr. Luden requires the cooperation of various interests representing special aspects of the problem which lie obviously outside of medical and clinical experience. It may be suggested that the facts recently presented by the Fuel Research Board of the Department of Scientific and Industrial Research of Great Britain should be taken into account and that, as far as possible, the method adopted by that Board should be followed. It is also important that there should be the most hearty cooperation on the part of the local Weather Bureau, since the ascertainment of smoke drift and the precise amount of atmospheric pollution are of themselves highly involved scientific questions. I may further refer in this connection to the valuable work on "Smoke; A Study of Town Air", by Cohen and Rushton, London, 1912; to an interesting report on "City Smoke Ordinances and Smoke Abatement", issued by the Bureau of Mines, 1912; the report of the Department of Smoke Inspection of the City of Chicago for the year 1911; and the annual reports and papers of the Coal Smoke Abatement Society of England, as well as the annual reports of the Atmospheric Pollution Commission of Manchester. The latter are unquestionably the most valuable publications of their kind, and as far as practicable, similar inquiries regarding the precise ascertainment as to the degree of atmospheric pollution should be

made in the Rochester area. I must also not omit mention of the reports of the Mellon Research Institute, Pittsburgh, although it is most regrettable that the investigations initiated some years ago should not have been continued.

A review of the recent literature and *information on cancer* leads to distinctly disturbing conclusions. Much of what is written is obviously amateurish, and exceedingly reckless public utterances have been made on a question of life and death to a considerable proportion of our people. In a recent medical column of a wellknown daily paper, offering free advice on medical questions, a correspondent is informed, merely on the basis of a superficial statement, that "the lump which has been in the mouth, as long as you can remember, is not cancer; see your physician. If this lump should be removed, he will do so; if not, do not tamper with it. The cure for cancer of the mouth is the very early removal of the tumor, or treatment by radium or x-ray, or both." The answer contains, of course, much that is useful, but the danger is that such advice will lead to neglect to consult a physician promptly. The article bears the inscription "Too Old For Cancer", when as a matter of fact, no adult age is exempt from the liability to cancer, particularly the age period above seventy. In the registration area the cancer death rate of males, ages 70 and over, has increased from 645 per 100,000 in 1909 to 758 in 1918; for females the cancer death rate in old age during the same period has increased from 790 to 902. It is, therefore, entirely misleading to say that anyone is too old for cancer, most of all on the basis of a letter and in ignorance of the actual facts. It, of course, may be assumed that the remark refers to the long duration of the cancerous growth, but the heading itself is misleading as much as the inference drawn from either conclusion.

An admirable illustration of the scientific methods of dealing with the cancer problem is an extremely suggestive address on *Cancer of the Tongue* by Sir D'Arcy Power, delivered before the Royal College of Surgeons, November 14, 1918. From this address I can only quote the following conclusions, deserving of most thoughtful consideration: "It ought to be possible to reduce cancer of the tongue to the subordinate position which it occupied before the 17th century in



man and which it still holds among the domestic animals. At the present time syphilis is more prevalent than it has been for many years and the consumption of tobacco has risen from 7,500,000 pounds in 1914 to 8,500,000 in 1918. Much of this tobacco is smoked in the form of cigarettes, and women now smoke on a much larger scale than they used to. It follows, therefore, that if allowed to continue as they are doing, there will be a large increase in the patients suffering from cancer of the tongue. Such an increase can be prevented by a thorough and systematic treatment of syphilis in its initial stage. For, as has been shown, cancer of the tongue has always increased in frequency during the same years that syphilis has been treated inadequately. Persons who are being treated for syphilis, therefore, should be told never to smoke, not to drink to excess and to pay regular visits to a dentist in order that their teeth may be kept in the best possible state and that dentures they may have to wear should be maintained well-fitting and free from rough edges. The address by Sir D'Arcy Powers is one of the strongest arguments against the theory advanced by those whose conclusions are governed by figures rather than by cancer facts, that the observed statistical increase in the disease is apparent and not real. For, if cancer of the tongue cannot be diagnosed adequately, no type of cancer can; and if, therefore, cancer of the tongue is increasing, it is clearly because of an increased liability to the disease and not because of an increased accuracy in diagnosis.

If facts like the foregoing could be brought clearly and emphatically before the public, much good would unquestionably result. But what is especially needed is a collective investigation illustrating the favorable *results of cancer operations*, with absolute impartiality, for a period of sufficient length. The willingness to submit to operations for appendicitis is primarily because of the clear public understanding that fatality in operations is practically nil, provided the disease is taken care of in the early stage. Likewise, progress in cancer operations will be made as the facts of successful operative results become better known and understood. It would seem that the College of Surgeons should take an active interest in this question, for no organization is better equipped for the purpose. Much

more is to be gained by research based upon human experience than by over-emphasizing animal research, where the conclusions may, or may not, be applicable to human beings.

The foregoing observations bring me to the question of *heredity*, in which the conclusions derived from animal experimentation are diametrically opposed to the facts, as far as known, for the human race. Cancer is certainly not inherited in human beings in the same sense as a hereditary predisposition is frequently apparent in tuberculosis. Cancer is now so common a disease of adult life that the occurrence of cancer cases in more than one individual in the same family may safely be looked upon as a true coincidence. The cases of exceptional frequency sometimes reported, even granting the absolute accuracy of the facts, are in the nature of abnormalities, with only a slight bearing upon the practical side of the question. There are no reasons why a cancerous predisposition should not be inherited, or, in other words, why persons living the same kind of lives, in the same kind of environment, subject to about the same external influences, should not suffer likewise from cancerous affections, but no statistical evidence is available to prove that cancer is inherited, in the accepted sense of the term, all the experiments on rats, mice and guinea pigs notwithstanding.

Much is said of *cancer villages*, cancer streets and cancer houses. But all investigations by qualified experts have shown the fallacy of the assumption other than as previously observed, that the general environment, the topographic features, or perhaps the occupational pursuits may predispose to an excessive rate of cancer frequency.

*Occupational cancers* are a fact and not a theory. Chimney-sweep's cancer is unquestionably a direct result of soot irritation, just as x-ray dermatitis is the direct result of x-ray exposure. Here also an extended discussion would be necessary to illustrate the problem from a practical point of view. X-ray dermatitis, however, may be referred to as evidence of external conditions, within our knowledge and understanding, acting as causative factors in malignant disease and there are no reasons for supposing that the true causative processes vary extensively from other forms of cancer than in oc-

cupational skin disease. It may be suggested in this connection that an investigation should be made into the possible occurrence of cancer as the result of employment in coal briquet making while at the same time more knowledge should be forthcoming as regards the possible effect of a smoky atmosphere on cancerous processes.

An important phase of the cancer problem is the higher rate of frequency of *cancer of the uterus among* married than among single women. This aspect of the question has been thoroughly inquired into by the British Registrar General, whose reports on the subject appear to be quite conclusive. The investigation has brought out the further and startling fact that cancer of the breast is relatively more frequent among the unmarried than among the married, and the same holds true of malignant ovarian tumors.

The statement has been made by Deelman, on the basis of Amsterdam statistics, that the average age at death from cancer of the body of the uterus was sixty-one years, but from cancer of the cervix only forty-nine years. Deelman's impressions from statistics, apparently not dealt with as critically as would be necessary, are that unmarried women develop fibromas in the uterus more frequently than the married. The material considered by Deelman and Treub should be re-examined by those qualified to do so. The subject of cancer mortality has for many years received special attention on the part of the Bureau of Municipal Statistics of Amsterdam and few governmental offices could render a more substantial service to the cause of trustworthy statistics, provided the material available is dealt with from both the medical and the statistical viewpoint by those thoroughly qualified to do so. The disturbed population conditions in Great Britain and the long intervening period since the taking of the last census preclude very trustworthy calculations of cancer rates at the present time, but according to the most recent British statistics, for the year 1919, the cancer death rate of women has increased at all ages over 75, while at younger ages a possibly stationary condition seems to have been reached. With reference to marital condition, the report for the period 1911-'13 shows the following significant differences: For cancer of the ovaries the rate was 6.0 per 100,000 for unmarried women, against 3.1 for the married and widowed. For cancer of the uterus

the rate was 16.9 per 100,000 for single women, against 29.3 for married women and widows. For cancer of the breast the rate was 34.6 for the unmarried and 23.8 for the married and widowed. This evidence would seem absolutely conclusive, the populations having been standardized and all care having been taken to secure accuracy in the results. The data leave no other conclusion than that unmarried women are more liable to cancer of the ovaries and the breast, while the married are more subject to cancer of the uterus, no details unfortunately being available to determine how far this conclusion applies to cancer of the body of the uterus and the cervix, but there are the strongest reasons for believing that a qualified analysis would bring out equally striking differences.

In this connection, I may again refer to the rarity of cancer of the breast among Japanese women, and as a matter of record I include the latest available data, according to which the rate is 2.0 per 100,000 of female population for the Empire of Japan, as compared or contrasted with a rate of 20.7 for England and Wales, 15.2 for Ireland and 18.2 for Scotland. All of these rates are for the period, 1914-1918. The data for the previous five years support identically the same conclusions. I, however, have gone further into this matter and made special inquiry of practicing physicians in Hawaii, thoroughly familiar with Japanese women, who report that cancer of the breast among them is extremely rare. It certainly would seem worth while that this extraordinary difference should be made the subject of special inquiry on the part of those qualified to do so.

Finally, I may refer to the apparent difference in cancer occurrence according to *economic status*. There seems to be no serious question of doubt but that cancer is more frequent among the well-to-do than among the poor; and since prosperity is practically the equivalent of hyper-nutrition, the conclusion would seem justified that over-nutrition is a predisposing factor of considerable importance. It is true that there is a divergence of opinion on this question, but my investigations conclusively prove that cancer is more common among persons of overweight than among those whose weight falls below the normal standard. Since poverty and under-nutrition, or malnutrition, go practically to-



gether, there is here another neglected field where specialized research gives promise of useful results. Dr. Luden's investigations into the metabolism of cancerous patients add materially to our existing knowledge on this subject.

The foregoing are merely a few random suggestions as to the direction in which cancer research is likely to yield useful results. The subject is one of such a multitude of aspects that there is practically no end to the possibilities of an effective coordination of existing scientific agencies to bring about a better state of knowledge than is extant at the present time. However difficult it may seem, the medical profession owes it to itself to encourage at least such research in two principal directions in which the public has perhaps the most profound, as well as the most practical interest. The first of these is the ascertainment of *after-results of operative interference*, to which I have had occasion to refer previously, but which I wish to emphasize again, as perhaps the most urgent need of a cancer campaign. The second is more difficult, but nevertheless equally urgent, and that is a thorough-going inquiry into so-called *cancer cures*, widely advertised, widely disseminated and, I am afraid, widely used. Whoever has gone into this matter must be familiar with the similarity of assertions, both as to the origin of the alleged cures and the methods of treatment employed, as well as the vague nature of the results. Yet, there are some extremely interesting exceptions to this statement, which indicate possibilities which it would not seem right and proper should be complacently set aside. I have during the present year had occasion several times to concern myself seriously with alleged cures, involving far-reaching possibilities of material harm. I firmly believe that the medical profession owes it to itself, as well as to the public, that it should initiate a thorough-going inquiry into any and all alleged cancer cures, or forms of treatment, not approved by physicians of reputable standing. The British government considered this question in a parliamentary investigation and the recommendations following were as drastic as they were likely to be effective. As an illustration of the dangerous nature of even world-wide propaganda for alleged cures, I may mention a press dispatch from Berlin to the effect that "Cancer has been cured by the injection of

child's blood into the veins of a cancer patient." Cases were announced by a doctor of Hamburg, whose name is a matter of record, and although both patients had been near to the point of death, the cure had apparently been successful, two cubic centimeters of blood having been injected twice daily. This astounding dispatch is amplified by the statement that "Cancer never affects children and it is one of the oldest theories in medicine that the fluids of the body have a healing power." It is by such assurances as these that the public is led astray, but happily there is a strong voice of protest from those entitled to be heard.

In conclusion, I wish to reemphasize the urgency of a well-considered educational movement in this state and section, aiming deliberately at the cancer education of the public. By calling public attention to the value of early diagnosis and early operative interference, a vast amount of good can be achieved in the direction of a material lowering of the cancer death rate, which is now not only excessive, but progressively increasing.

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## PRESENT STATUS OF SPLENECTOMY AS A THERAPEUTIC MEASURE\*

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### INTRODUCTION

The Southern Minnesota Medical Association is a sectional society with a national outlook. There is a family spirit in its membership which is unique among medical associations. It is large enough to be free from cliques and misunderstandings, yet small enough to maintain a community interest. I am pleased to be its presiding officer. The association is diversified in its personnel. Men who are widely known for their researches, their special skill, or their medical vision come into close contact with private practitioners who have a wide general knowledge of medical practice and in addition to this a special knowledge, which the general practitioner himself does not appreciate, of the early symptoms of disease.

One who has carefully read Sir James McKenzie's recent book entitled "The Future of Medicine", is, I believe, convinced that the future of medicine lies in the realm of the general practitioner, chiefly because of his opportunity to study the very earliest symptoms of disease, to watch the development of disease from its very incipency, and to ascertain the prognosis of disease as the result of his opportunity to observe patients over periods of years. He must of course, foster the research spirit, learn to in-

vestigate accurately, and above all to keep records.

Sir James McKenzie divides disease into four stages:

1. The predisposing stage in which the individual's resistance may be low and he may be susceptible to the attack from without.
2. The early stage in which there is no perceptible alteration of tissue.
3. The advanced stage in which there is definite modification of tissue, and physical signs are present.
4. The final stage, or death.

McKenzie points out that most divisions of knowledge evolve forward while medicine has evolved backward. A vast amount of knowledge has been accumulated concerning the advanced stages of disease but the early periods during which there are no perceptible changes of tissue, and the predisposing elements are those which we must learn to study; and in many instances we do not even know how to attack the problems.

The general practitioner has always had the opportunity to discover those things which we need most to know; that is, the conditions favoring the onset of disease, the circumstances which lead up to the invasion, the early symptoms of disease and their production. The general practitioner has not, however, developed the habit of keeping records nor has he heretofore been educated in the schools for clinical investigation. He has in some instances educated himself and has become especially interested in a study of certain phases of disease. When this has occurred the result has frequently been the discovery of a very important fact.

A medical association of the type of the Southern Minnesota Medical Association should, I believe, make a direct effort to stimulate clinical research among its members. In my own experience I long ago determined that the general practitioner has a great fund of knowledge concerning disease which no one else possesses and which he himself is not in a position to impart. I hope that some plan may be evolved by which members of this association may be referred through the secretary, or some special officer of the society, to those who are able to give them actual assistance in the solution of any problem which they wish to attack.

\*President's address before the Southern Minnesota Medical Association, Mankato, November, 1920.



Our programs may then be made representative of the entire field of medicine.

#### THE FUNCTION OF THE SPLEEN AS RELATED TO CLINICAL EXPERIENCE

The first essential fact with regard to splenectomy is that it eliminates the largest lymphoid organ in the body. That the spleen is structurally lymphoid is frequently overlooked in discussions of splenic function and very little clinical evidence is at hand concerning the effect of splenectomy in conditions associated with lymphocytic hyperplasia. The second outstanding clinical fact with regard to splenectomy is the definite establishment of its remarkable effect in the cure of hemolytic jaundice. It seems most likely that if the spleen has a specific function this function will be discovered in connection with a study of its activity in hemolytic jaundice. The icterus of hemolytic jaundice is largely the result of increased hemolysis and hemolysis seems to be intimately related to the function of the liver. Splenectomy can be said to be a symptomatic cure for hemolytic jaundice unless the anemia has been of such long duration and of such severe type that it has assumed the features of a primary anemia, in which event the blood count does not return to normal, but the patient lives indefinitely. A third striking clinical fact concerning the effect of splenectomy in all forms of disease in which splenomegaly is associated with a secondary type of anemia is that the anemia itself is less severe after splenectomy than it was before, even though the disease may not have been cured by the operation. In the fourth place removal of a very much enlarged spleen markedly reduces the amount of blood which has to pass through the liver. The removal of a small spleen is of doubtful effect on the liver. If a small spleen associated with an advanced portal cirrhosis is removed the clinical result may not be satisfactory. If the large spleen of splenic anemia which has become associated with an equally advanced portal cirrhosis is removed, the clinical result may be quite remarkable, yet there is no reason definitely to assert that the etiology of the two conditions is essentially different. Fifth, it must not be entirely overlooked that the removal of an abnormally large spleen may be a relief to the patient from a mechanical

standpoint, although this factor alone would rarely lead to a decision for splenectomy.

#### SPLENECTOMY

At this time I shall give a general review of the 245 cases in which splenectomy has been performed at the Mayo Clinic up to September 20, 1920 (Table 1).

Table 1  
SPLENECTOMY  
To September 20, 1920

|  | Cases |
|--|-------|
| Splenic anemia.....                        | 71    |
| Septic splenomegaly.....                   | 10    |
| Hemolytic jaundice.....                    | 32    |
| Pernicious anemia.....                     | 53    |
| Myelogenous leukemia.....                  | 26    |
| Portal cirrhosis.....                      | 10    |
| Biliary cirrhosis.....                     | 6     |
| Luetic splenomegaly.....                   | 6     |
| Lymphocytic splenomegaly.....              | 6     |
| Gaucher's disease.....                     | 4     |
| Tuberculosis of the spleen.....            | 4     |
| Wandering spleen.....                      | 2     |
| Hodgkin's disease.....                     | 1     |
| Eosinophilia with splenomegaly.....        | 1     |
| Neutrophilia with splenomegaly.....        | 1     |
| Local bleeding at operation.....           | 1     |
| Miscellaneous, questionable diagnosis..... | 11    |
| Total .....                                | 245   |

#### OPERATIVE MORTALITY

The number of hospital deaths in the series of 245 cases was twenty-six (10.6+ per cent). This mortality can not be applied, however, to individual groups of cases. The percentage is somewhat higher in cases of large adherent spleens and in conditions in which hemorrhage is apt to occur, and is very much lower in cases in which the spleen is small and the operation is not accompanied by technical difficulties (Table 2).

Table 2  
HOSPITAL MORTALITY IN THE LARGER GROUPS  
OF SPLENECTOMIZED PATIENTS

|                           | Cases | Deaths | Per cent |
|---------------------------|-------|--------|----------|
| Splenic anemia.....       | 71    | 9      | 12.6     |
| Hemolytic jaundice.....   | 32    | 1      | 3.1      |
| Pernicious anemia.....    | 53    | 3      | 5.6      |
| Myelogenous leukemia..... | 26    | 1      | 3.8      |

The hospital mortality for splenic anemia is much higher than for any other group. The spleen of splenic anemia is large and fibrous; perisplenitis is common; the blood vessels are usually markedly enlarged sometimes thrombotic and the operation is correspondingly difficult. Similar conditions occur in septic splenomegaly in which a chronic recurring sepsis over a period of years has resulted in an enlargement of the spleen accompanied by secondary anemia. In

fact the only distinction between splenic anemia and septic splenomegaly is that the process is localized in splenic anemia and the history and the findings are of a more generalized chronic recurrent infection in cases of septic splenomegaly. Much clinical evidence indicates that splenic anemia is a localized form of chronic sepsis. The low operative mortality (3.1 per cent) in cases of hemolytic jaundice is especially gratifying in view of the excellent ultimate result in these cases. There was a similarly low operative mortality in cases of pernicious anemia and myelogenous leukemia.

SPLenic ANEMIA

Table 3 shows the course of patients splenectomized for splenic anemia.

Table 3

SPLenic ANEMIA

|   |    |
|---|----|
| Cases to September 20, 1920.....  | 71 |
| Hospital deaths (12.6 per cent).....                                    | 9  |
| Subsequent deaths.....  | 22 |
| Patients heard from.....  | 28 |
| In good condition.....  | 22 |
| In fair coindition.....   | 5  |
| In poor condition.....  | 1  |
| Patients operated on five years or more.....                            | 27 |
| Patients who lived more than five years.....                            | 17 |
| Still living.....   | 16 |
| Note: One patient is well eleven years and five months after operation. |    |

Immediate hospital mortality was due to hemorrhage in only one instance. Thrombosis of the portal and mesenteric vessels caused death in two instances, while influenza pneumonia, and pulmonary embolus account for the others. The immediate occurrence of localized hematoma, subdiaphragmatic abscess or left pleurisy were important factors in protracted convalescence.

The large number of subsequent deaths (twenty-two) will be noted in this group. The cause of these subsequent deaths at once becomes a matter of inquiry. Four of the patients who recovered from the operation died within three months. Fifteen of those who died later lived longer than two years. The average length of life of those who recovered from operation and who have subsequently died was two years and five months.

It is an important observation that hemorrhage in the form of hematemesis was evidently the cause of death in eight instances. In two of these the fatal hemorrhage followed operation by five years and two months. So far as we know postoperative hemorrhage occurred in

a total of fourteen cases. Cirrhosis of the liver, with ascites and severe anemia, is given as the cause of subsequent death in four cases, although it was doubtless a contributive cause in a majority of the deaths.

Definite knowledge that twenty-seven of twenty-eight patients recently heard from are in good or fairly good condition is important and seems entirely to justify the continuance of splenectomy in cases of simple splenomegaly in which the process is localized to the spleen or to the spleen and liver. A demonstration that the splenic enlargement is marked and evidence that the enlargement of the spleen was primary are essential in the decision for surgical treatment in splenic anemia.

SEPTIC SPLENOMEGALY

Although a great deal of evidence indicates that splenic anemia is the result of a localized form of sepsis it seems best to consider separately certain cases of splenomegaly which are associated with a history of chronic recurrent attacks of one form or another or several forms of septic exacerbation; for example, localized phlebitis, recurrent tonsilitis, recurrent furunculosis, or ulcerative endocarditis. In such cases marked enlargement of the spleen, frequently associated with severe anemia of the secondary type and even presenting leukopenia, may eventually develop. In other words in most respects aside from their previous history, they may closely resemble splenic anemia. Table 4 shows the data in ten cases of this type which have been separated from the cases of splenic anemia.

Table 4

SEPTIC SPLENOMEGALY

|                                    |    |
|------------------------------------|----|
| Cases to September 20, 1920.....   | 10 |
| Hospital deaths (20 per cent)..... | 2  |
| Subsequent deaths.....             | 5  |
| Patients living.....               | 3  |
| In good condition.....             | 1  |
| In fair condition.....             | 2  |

The hospital mortality of 20 per cent may be accounted for by the small number of cases in the group, although the mortality would be expected to be slightly higher than in splenic anemia. The fact that five patients have died may be regarded as evidence that the resistance of the organism to disease has been greatly decreased by the chronic recurrent sepsis. The five patients all died within seven months of cardiac or renal disease. Only one of the three



patients living is in good condition. The conclusion seems to be clear that the patient with splenomegaly and anemia, which simulates splenic anemia, associated with a long history of chronic recurring sepsis is rarely benefited by splenectomy, probably because there has been previous damage to the function of vital organs which is irreparable. A careful estimation of cardiorenal sufficiency should be made before operation.

#### HEMOLYTIC JAUNDICE

Hemolytic jaundice, hemolytic icterus, or acholuric jaundice, is a very clearly defined clinical entity. Whether the cases are familial, congenital, or so-called acquired in type, their clinical manifestations are the same and their characteristics exceptionally well defined, that is, (1) chronic jaundice of many years' duration. (2) periodical exacerbations usually associated with crises consisting of abdominal distress, headache, and fever, (3) the absence of bile in the urine and its presence in the stools, except at the time of crises, (4) the development of gallstone colic later in the history, and (5) the finding of an increased fragility of the erythrocytes in the peripheral circulation. Table 5 shows our experience with hemolytic jaundice:

Table 5  
HEMOLYTIC JAUNDICE

|   |    |
|---|----|
| Cases to September 20, 1920.....                | 32 |
| Hospital deaths (3.1 per cent).....             | 1  |
| Subsequent deaths.....                          | 3  |
| Patients heard from.....                        | 26 |
| In good condition.....                          | 22 |
| In fair condition.....                          | 4  |
| One patient is well nine years after operation. |    |

The cause of one of the deaths in this group was not given; the second patient developed a peculiar form of gangrenous dermatitis which probably had no relationship to the hemolytic jaundice; while the third recovered entirely from his hemolytic jaundice, but died two years and two months later following an operation elsewhere, for gallstones. The fact that three patients seem to be only in fairly good condition is, I believe, to be expected. Not infrequently patients whose history of hemolytic jaundice goes back to infancy are constitutionally somewhat delicate and neurotic. It is not surprising then to find that splenectomy has not entirely eliminated the constitutional inferiority which some of these patients possess. In

general our experience with splenectomy for hemolytic jaundice has been satisfactory; the hospital mortality is low, the patients are rapidly cured of jaundice and anemia, and their subsequent health is the good health of the average person.

#### PERNICIOUS ANEMIA

Clear indications for splenectomy in cases of pernicious anemia have not been anticipated at any time. It was thought, however, that a prolongation of life might be effected. Table 6 reveals the results in our cases.

Table 6  
PERNICIOUS ANEMIA

|                                     |    |
|-------------------------------------|----|
| Cases to September 20, 1920.....    | 53 |
| Hospital deaths (5.6 per cent)..... | 3  |
| Subsequent deaths.....              | 43 |
| Patients living.....                | 7  |

Eleven patients lived more than three years after operation, five are still living between four and five years after operation.

It will be observed in this table that the hospital mortality is satisfactory, 5.6 per cent. The large number of subsequent deaths in this group is to be expected. It is rather surprising, however, that eleven patients lived more than three years after operation, and that five patients are living in good health and able to work almost five years from the time of operation. That is, 20 per cent of the patients lived more than three years, giving a total duration for the disease of more than four years, while 10 per cent of the patients are living almost five years from the date of operation, giving a total duration of the disease of almost six years. These statistics quite definitely indicate a prolongation of life in a certain percentage of the patients. Whether these findings would be sufficient to lead to splenectomy in many cases of pernicious anemia is questionable; on the other hand, it might seem advisable in individual cases, after all aspects of the question have been considered, to decide on splenectomy. Splenectomy will without doubt cause an increased activity of the bone marrow, and in almost every instance will lead to a remission of at least several months. The operation is certainly not yet to be discarded.\*

#### MYELOGENOUS LEUKEMIA

The patients with myelogenous leukemia were splenectomized after preliminary treatment

\*Giffin, H. Z. and Szlapka, T. L.: The treatment of pernicious anemia by splenectomy. Jour. Am. Med. Assn., 1921, lxxvi, 290-295.

with radium. The results are outlined in Table 7.

Table 7  
MYELOGENOUS LEUKEMIA

|  |    |
|--|----|
| Cases to September 20, 1920.....   | 26 |
| Hospital deaths (3.8 per cent).....  | 1  |
| Subsequent deaths.....   | 15 |
| Patients heard from.....   | 7  |
| In good condition.....   | 5  |
| In poor condition.....   | 2  |
| One patient died five years four and one-half months after operations; seven patients lived more than three years after operation, six of these are still alive. |    |

The hospital mortality after preliminary treatment and reduction in the size of the spleen is satisfactory, 3.8 per cent. The total number of subsequent deaths in this group is somewhat smaller and the length of life of some of the patients somewhat longer than would be expected; seven patients lived more than three years after operation and six of these are still living. It has been observed that the patients are less likely to develop severe anemia if they have been splenectomized. They are also relieved mechanically of the discomfort associated with splenic enlargement, they are much more likely, however, to have great enlargement of the liver, but this enlargement does not seem to be so great a cause of discomfort as marked enlargement of the spleen. The removal of the spleen in very chronic types of myelogenous leukemia in which the organ is fibrous and the leukocyte count never very high may be definitely advisable. In certain other selected cases, in view of all the circumstances, splenectomy may be recommended, but in the great majority of cases of myelogenous leukemia it is of questionable value.

It is inadvisable at this time to consider in detail all of the remaining groups of cases both because of the variety of conditions included and because of the small number of cases in each group. I shall, however, review in some detail portal cirrhosis, biliary cirrhosis, lymphosarcoma, and benign lymphoma, syphilitic splenomegaly, and localized tuberculosis of the spleen.

#### PORTAL CIRRHOSIS

It is probable that every case of marked splenomegaly is associated with a certain degree of cirrhosis of the liver. From the pathologic standpoint cirrhosis of the liver may best be grouped as portal or biliary in type. This classification is satisfactory from the clinical

standpoint, although a certain number of cases will be quite definitely mixed in type. The cases which I have classified as portal cirrhosis are those in which there seems to be no question that the cirrhosis of the liver is the primary and predominant condition. Cases of splenic anemia in the Banti stage are not included. The diagnosis has been made after a consideration of the clinical, the surgical and, in some instances, the postmortem findings. Occasionally a case is observed, however, in which it is impossible to determine whether the splenomegaly or the cirrhosis is more marked and in which the pathologic change in the spleen and in the liver seem to go hand in hand. Whether there is any essential difference between splenic anemia, septic splenomegaly, Banti's disease, and cirrhosis of the liver remains questionable. Ten cases were grouped as portal cirrhosis. The hospital mortality was very high in this group; four patients died. Three other patients died subsequently within one year of operation. One patient is in fair condition one year following operation, one is living four years following operation, but we have no report of his condition, and another is in good condition two years following operation. Although the number of cases in this group is small it is quite definite, I believe, that in cases of advanced portal cirrhosis in which the spleen is not markedly enlarged splenectomy should be advised with extreme caution. On the other hand in patients with splenic anemia in which a marked splenomegaly has existed for years and portal cirrhosis with ascites has developed later splenectomy may be followed by remarkable results. This difference is probably due to the fact that splenectomy in the cases in which the spleens were small reduces the amount of blood passing to the liver much less than in cases in which the spleens were very large.

#### BILIARY CIRRHOSIS

Biliary cirrhosis is as a rule associated with an enlarged smooth liver, early jaundice, and slight or moderate splenomegaly. Frequently there is evidence of increased hemolysis. Six cases have been classified in this group; all of these patients are dead. One patient died in the hospital and five have died subsequently. The length of life after operation has been somewhat longer than in the cases of portal cirrhosis. One patient died five years after operation, one



three years, the remaining three in less than two years.

#### LYMPHOCYTIC SPLENOMEGALY

In this group are considered the six cases in which the spleen has shown an extreme degree of lymphocytic hyperplasia. There is a distinction between the lymphosarcoma which originates in a definitely localized tumor with subsequent metastasis and the less malignant lymphoma or lymphadenoma which is more generalized. It may be impossible to differentiate even pathologically active malignancy and the more benign processes in the tissue from these cases. One of the patients returned within six months with generalized glandular enlargement and died within one year following operation. The course was that of a malignant condition. One other patient died eight years following operation; the cause of death is not definitely known, but malignant involvement of the liver or cirrhosis is suspected. The remaining four patients are alive and in good condition, one thirteen years, two more than two years, and one six months after operation. The good result following splenectomy in cases showing lymphocytic hyperplasia of the spleen may be of more than incidental importance.

#### SYPHILITIC SPLENOMEGALY

Our experience with splenectomy in cases of splenomegaly associated with syphilis and syph-

ilitic liver has been very satisfactory. The operation has been advised when antisiphilic treatment failed to bring about satisfactory improvement in the general condition and in the anemia. Splenectomy was performed in six cases of this type. There was one death in the hospital; the patient died of hemorrhage. The remaining five patients are alive and all seem to be in good condition, two, six years following operation. Treatment for syphilis was more effective following splenectomy than before.

#### LOCALIZED TUBERCULOSIS OF THE SPLEEN

If it can be demonstrated that tuberculosis is chiefly localized in the spleen or about the spleen splenectomy is followed by very good results. Four tuberculosis spleens occurred in this series. There was one subsequent death of generalized tuberculosis six months following operation. It is probable in this instance that active lesions were present elsewhere in the body at the time of operation. The other three patients are in good condition, one more than three years following operation and two more than four years following operation. A marked anemia was present which promptly improved after splenectomy. Two patients had a previous history of tuberculous peritonitis.

#### SPLENECTOMY FOR MISCELLANEOUS CONDITIONS

Data concerning the postoperative duration of life in the remaining groups of cases in this series are given in Table 8.

Table 8  
SPLENECTOMY—MISCELLANEOUS

| Diagnosis                      | Cases | Hospital deaths | Subsequent deaths | Deaths   | Remarks   |
|--------------------------------|-------|-----------------|-------------------|--|---|
| Gaucher's disease              | 4     | 1               | 1                 | One more than 3 years after operation.                           | No report from one; one in good condition more than 12 years after operation.   |
| Wandering spleen               | 2     | 0               | 0                 |  | One in fair condition more than 7 years after operation and one in good condition more than 12 years after operation.                                 |
| Splenomegaly with eosinophilia | 1     | 0               | 1                 | More than 4 years after operation.                               |   |
| Splenomegaly with neutrophilia | 1     | 1               |                   |  |   |
| Local bleeding at operation    | 1     | 0               | 1                 | Less than 1 year after operation.                                |   |
| Hodgkin's disease              | 1     | 0               | 1                 | Less than 1 year after operation.                                |   |
| Miscellaneous questionable     | 11    | 2               | 5                 | Four less than 1 year and one less than 2 years after operation. | No report from one; one in good condition less than one year and one less than two years; one in fair condition less than five years after operation. |

## SUMMARY

A general survey, especially with respect to operative death and postoperative duration of life, has been made of 245 cases of splenectomy, for various diseases. Detailed consideration of the different groups of cases must necessarily be undertaken in separate papers.

## HEMOLYTIC ICTERUS\*

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In almost every community are persons with chronic jaundice who are otherwise in fair health. Inquiry into the history of such persons develops the fact that the jaundice is not the ordinary type of obstructive jaundice, for it lacks the two cardinal features: clay-colored stools, and bile in the urine. The jaundice is usually of mild degree and is not often accompanied by itching. Think of the picture of jaundice from obstruction by gallstones in the common duct, accompanied by pain, at intervals by chills and fever, and increase of the yellowness, the stools clay-colored and the urine loaded with bile; or again of the painless jaundice from obstruction of the common duct from malignant disease, with clay-colored stools and bile-stained urine, the emaciation and progressive deterioration of general health, and in 84 per cent a distended gallbladder to be felt as a rounded tumor below the margin of the ribs. Obstructive jaundice from any cause should be readily distinguished from hemolytic icterus, badly named.

Early writers spoke of hemolytic icterus as chronic biliousness. Murchison, in 1885, reported chronic jaundice of the acholuric type in several members of a family. He appears to be the first to give a clear description of the familial type, and to call attention to the congenital type. Later the acquired jaundice of the same general description, usually in young adults, was recorded in the literature, and it was noted that the acquired disease as a rule developed more rapidly than the familial and congenital, the consequent anemia was more actively progressive, and death occurred from intercurrent

disease at an earlier period than in the other types. Hayem, in 1898, gave a description of hemolytic icterus as a clinical entity. Thayer and Morris, in 1911, published the earliest description in this country of the disease. Chauffard demonstrated that there is increased fragility of the red blood cells in the congenital, familial, and acquired types, an observation of the highest importance in connection with this disease. Sanford has worked out a simple process of estimating red blood-cell fragility which is very useful in the Clinic in making diagnoses since this is a basic condition which does not disappear even after cure of the disease.

While it must be admitted that there are differences to be observed clinically in the congenital, familial, and acquired types of hemolytic icterus it can be asserted quite definitely that they are one and the same disease with essentially the same manifestations. The histories in such cases vary markedly; some persons with the congenital and familial types go through life in a fair degree of health, but the rule is that the disease is progressive and eventuates in a fatal anemia. The patient with hemolytic icterus is subjected to many dangers to which a normal person is not subjected and his life expectancy is seriously menaced, and in the more severe cases a fatal ending may be anticipated. The physical findings of these patients are characteristic. The spleen is definitely enlarged, and as a rule the liver is moderately enlarged. So-called crises occur with exacerbations of the jaundice, in which there are malaise, moderate fever, and sometimes chills with increased tenderness over the spleen and liver. The fact that in all cases of hemolytic icterus the spleen is enlarged suggested even to the earliest observers that the cause is splenic. It is well known that one of the functions of the spleen in the adult is to destroy worn-out red blood corpuscles. There is good reason to believe that the spleen does not wantonly destroy healthy red corpuscles but only those which have deteriorated, that the fragility of the red cells in hemolytic icterus is of extrasplenic origin and this cell defect leads to their destruction in the spleen, and that the enlargement of the spleen might be considered a work hypertrophy. Physiologists in early days estimated that all

\*Presented before the Southern Minnesota Medical Association, Mankato, November 29, 1920.



the red cells of the body are destroyed and replaced in the course of a week. This estimation was based on a consideration of the bile pigment. It was believed that all the bile pigment is derived from red-cell destruction. The work of Whipple has shown that there are other sources of origin of bile pigments. Winifred Ashby, by a series of very interesting experiments in the Clinic, has demonstrated that the red blood cells may live from thirty to forty days, and it is quite probable that they may live much longer.

The spleen may be looked on as an adjunct to the liver and its function considered largely as that of a strainer, the material strained being sent to the liver for final elaboration. The enlargement of the liver in hemolytic icterus is possibly also a work hypertrophy, at least the hepatic tissue in our cases showed cell hyperplasia. The liver is exposed to certain secondary changes or complications as the result of being inundated with red-cell pigment, and this is shown by the tendency to the formation of pigment gallstones; such gallstones have been found in three of every five of all cases of hemolytic icterus in which we have operated. The gallstones are a menace and may cause infections in the gallbladder and in the common duct which may travel upward into the liver ducts, producing a complicating biliary cirrhosis as a result of the deposit of connective tissue around the bile ducts; a combination of hemolytic icterus with obstructions from infections of the biliary ducts may interfere with the diagnosis. In several of our early cases the clear-cut history of gallstone attacks, the extension of infection to the liver ducts and to the pancreas, causing chronic pancreatitis, made the gallstones appear to be the primary disease and the splenomegalia secondary. To our surprise after all the stones were removed the jaundice continued, although it was very evident that it was not due to obstruction. The stool and urine had become normal in color and the gallstone attacks had disappeared, although there was a continuation at intervals of the abdominal crises. Later, removal of the spleen cured these patients. Specimens of liver removed for microscopic examination in some of the cases have shown the hyperplasia of the liver cells to be

accompanied by evidences of biliary cirrhosis secondary to the gallstone disease.

Hanot's disease of the liver may be a clinical entity. I am not certain that I have ever seen a case. It certainly has no pathologic basis. The fact that it occurs in the young and that the spleen and liver are both enlarged leads to the suspicion that the majority of conditions called Hanot's cirrhosis are either biliary cirrhosis or hemolytic icterus, or a combination of the two.

My attention was first directed to the surgical significance of hemolytic icterus in 1915 by Kanavel's and Elliott's splendid paper. They reported from the literature forty-eight cases in which operation had been performed with but two deaths, thus definitely determining that splenectomy cures the disease. Kanavel and Elliott point out that several successful splenectomies were performed before there was real knowledge of the disease. Spencer Wells, in 1888, and Bland-Sutton, in 1895, had contributed the report of a splenectomy to the literature on the subject. Krumbhaar, in 1915, in a review of 158 cases, showed that 14 per cent were congenital, 35 per cent acquired, and 51 per cent familial. Since the three conditions are alike too much consideration should not be given to the type of the disease, but rather to its effect on the blood, and while it is true that the acquired type is potentially more serious, both congenital and familial types are slowly progressive and may require splenectomy.

Minkowski, Eppinger, and Banti, point out the direct relationship of the spleen to all types of hemolytic icterus.

I know of nothing more remarkable in the results of surgery than the disappearance of jaundice, which the patient may have had all his life, within three or four days after removal of the spleen, and the speed with which recovery from the anemic state takes place. We have removed the spleen in thirty-two cases of hemolytic icterus, with one death, and this death should have been avoided; the spleen was removed during a crisis; in a few hours the patient developed delirium, and died in coma forty-eight hours after the operation. It is very evident that these patients should not be operated on during a crisis.

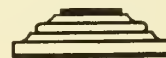
The technic used in the Clinic for splenectomy

is that developed by Balfour and reported in 1916. A midline incision, as pointed out by Ochsner and Percy, is preferable to any of the left lateral incisions, since it permits access to the gallbladder, appendix, and so forth, and severs few blood-vessels. The spleen in hemolytic icterus as a rule is not very adherent and may readily be separated from its peritoneal attachments. If the spleen is drawn downward and toward the midline, as adhesions are separated by the hand, the splenic space can be packed with a large gauze compress which temporarily and usually permanently checks hemorrhages from separated adhesions.<sup>13</sup> The attachments of the spleen to the stomach through the vasa brevia are separated and tied, and the attachments of the splenic flexure of the colon at the lower pole are separated. The superior edge of the spleen is turned outward and the tail of the pancreas dissected out from the pancreatic notch in the spleen. The spleen is lifted out of the abdomen, the bloodless peritoneal attachments are quickly separated with the knife, and the pedicle grasped with two forceps, cut, and double-tied. As a rule on removal of the pack the splenic space will be found dry; if not, progressive suturing with catgut can be carried along the upper border of the pancreas, uniting the separated peritoneal structures down to the diaphragm. If the bleeding extends onto the diaphragm care should be taken not to tear a hole into the pericardium or the pleura with the needle, an accident which I had on one occasion, fortunately without harm. On inspiration the diaphragm comes down, and the attachments which contain the bleeding point may be caught quickly with the needle with at least 15 cm. of suture slack in the fingers; this enables the catgut to follow the diaphragm as it ascends in expiration, the needle being caught again when inspiration brings it down.

In conclusion I again emphasize that hemolytic icterus is not an infrequent cause of chronic jaundice, progressive anemia, and early death. Splenectomy is the cure.

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# THREE NEUROPSYCHIATRIC NOTES: EPILEPSY, LETHARGIC ENCEPHALITIS AND THE DEMENTIA PRECOX SYNDROME\*

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Hughlings Jackson once remarked that there was no such thing as ordinary epilepsy. Experience confirms this statement. One readily recalls patients showing the symptoms of essential epilepsy in whom a month, or possibly years afterwards, optic neuritis and the objective signs of brain tumor became clearly apparent. A patient of mine, a minister, immediately after his Easter sermon was taken with a severe convulsion† The neurological examination was negative, yet within two months the cardinal signs of a brain tumor were manifested. Another, the wife of a physician, was greatly startled by a convulsion; our findings were all negative, nevertheless six months later the symptoms of a brain tumor were clearly marked. Autopsy showed in both patients deeply seated inoperable growths. Dr. James Taylor, London, reports two cases observed at Queen's Square of apparently chronic epilepsy. In one, symptoms characteristically those of essential epilepsy appeared four years, in the other seventeen years, before any signs of a brain lesion were recognizable. Autopsy as in my cases revealed large neoplasms. Twenty years ago I heard Sir Victor Horsley describe a case in which he found an inoperable brain growth which had been treated on the Continent for several years as an idiopathic epilepsy. Epilepsy developing after the third decade is due either to chronic brain disease or it has existed for years as a *petit mal* or nocturnal attacks of so slight a type as to have failed of recognition on the part of the patient or his family, the occurrence of the convulsion causing him to seek medical advice. It must not be overlooked that the secondary or organic epilepsies may respond as favorably to anti-convulsive drugs as those of the essential type, thus adding greatly to the difficulty of diagnosis; the occurrence of a con-

vulsion by no means predicates its existence; only repeated examinations and prolonged opportunity for observation will enable one to arrive at a diagnosis of the real cause of the convulsive seizure. The terms nocturnal epilepsy is unfortunate since it does not indicate a distinct type; it only means that the attacks follow sleep and consequently occur more frequently at night. (Taylor).

Atypical epilepsies are an interesting study. A patient of mine who for years had suffered from attacks of *grand mal* was greatly surprised to have these cease and in their stead to be subject to similar periodic seizures in which the symptoms were those of a generalized tremor of the entire body. Mentality was unaffected, the disruptive cortical discharge affecting apparently only the motor cortex. It is well known that dislocations of the shoulder joint may follow a severe convulsion; not only may this fail of recognition, but there is danger of its being misinterpreted as a paralysis often seen after a Jacksonian epilepsy. Spasmophilia, unfortunately, is too frequently confused with epilepsy, sadly to the detriment of the patient. If one remembers that the former occurs usually between seven months and three years, seldom as late as the sixth or eighth year, that it is seen most usually in the spring and fall, that it manifests a trinity of symptoms, namely laryngeal spasm, tetany, and convulsions, and that there is a marked mechanical and electrical irritability of the motor nerves, the differentiation between these two conditions will not be a matter of great difficulty.

The therapy of epilepsy remains in the empirical stage. Unfortunately the tendency to treat the disease rather than the patient still persists. Taylor, whose experiences with these patients at Queen's Square has been exceptionally great, regards bromide\* as the sheet anchor of our therapeutics. Children bear the drug well and as a rule they are given too small doses. The individual case should govern the dosage. Many years ago Seguin advised its combination with chloral; thus used it is most efficacious. I remember one boy who was having one hundred and twenty-five attacks of *petit mal* daily. Under this medication he ap-

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

\*Turner of London reports a cure of 23.5 per cent, with a great benefit to another 50 per cent with small doses of bromide alone.

parently made a good recovery; it is four years since he has had an epileptic attack. A decade or more ago Turner of London, recommended the use of Gelineau's dragees, an anti-convulsive preparation composed of arsenic 1-64th grain: bromide of potassium 15 grains; and picrotoxin 1-128th grain. It gives much better results clinically than bromide either singly or in combination. Bromide disagrees with certain patients, increasing the number of seizures and greatly depressing them. Where it has failed, Taylor has found tincture of belladonna effective. In so-called nocturnal epilepsy he advises that tincture of digitalis be added to the bromide. In the majority of epileptics, I have found luminal an excellent substitute for bromide. Therapeutically, it is certainly far more efficient in controlling the seizures. In 1916, Dr. Ball and Dr. Grinker, in their discussion of Dr. Dercum's paper "Epilepsy with Special Reference to Treatment," before the Section of Nervous and Mental Diseases of the American Medical Association, emphasized its value. The dose varies from three-fourths of a grain to one grain three times a day, or it may be given in one dose at night. Intractable cases may require temporarily from six to nine grains in 24 hours. The dosage should be gaged so as to avoid drowsiness. It is a safe, non-habit forming drug and there are really no contraindications to its use. In 100 cases treated by Grinker, only two patients developed rashes, necessitating its discontinuance, and there were no urinary disturbances. Its combination with extract of pituitary body, where there is evidence of its dysfunction, adds markedly to its therapeutic value. Success in the treatment of this disease has never appeared so promising as since this form of therapy has been on trial. From the patient's point of view it is certainly preferable. There is no mortifying aene and the depressing and stupefying effects of the drug are no longer to be dreaded.

#### LETHARGIC ENCEPHALITIS

As medical men during the past year we have become only too familiar with the symptoms of epidemic lethargic encephalitis. Professor Netter states that there have been more than fifteen hundred cases in Paris and ten thousand in other parts of France. Any attempt to classify it as to type is futile. One can

only designate certain outstanding signs, such as lethargy. The simple fact is, as a recent editorial in the British Medical Journal states, there are probably many varieties of virus not yet clearly differentiated, capable of causing a diffuse inflammation of the central nervous system and producing a clinical picture of an acute nervous disease, its symptoms depending on the point of initial localization of the infection. The distinction between these is yet far from absolute, since many of these symptoms are too often the same. In such affections as typhoid fever, acute millary tuberculosis, meningitis associated with mumps, tubercular meningitis, acute choreic symptoms, and syphilis of the central nervous system, a differentiation from lethargic encephalitis is a matter of great difficulty. The important fact is that there is a form of encephalitis with a definite pathology giving rise to a clinical syndrome which possesses a great variety of symptoms common to all forms of encephalitis, yet showing certain distinct characteristic features such as lethargy with diplopia, its cause being a virus separate and distinct from that of influenza, poliomyelitis or any of the infections involving the central nervous system. The following classification is suggestive, but is by no means all-inclusive: the paralysis agitans syndrome; delirium with myoclonic contractions; meningeal irritation associated with irritation or paralysis of the cranial or peripheral nerve roots; and hemiplegia with hemianesthesia.

Emphasis should be placed on the early diagnosis of abortive or ambulant cases which too commonly escape recognition. Patients affected with so grave a disease as inflammation of the brain should be advised against the continuing of their normal activities even in the absence of fever, vomiting or headache. Taylor reports a case in which for a time there was an overpowering drowsiness, the patient having to be awakened to take food; after this passed the only symptoms were diplopia, nystagmus and weakness; recovery was rapid. Buzzard and Greenfield call attention to the inclination to fall asleep while sitting down to rest, a tendency to forget the happenings of the day, with possibly a change of temperament and a transient diplopia as the only symptoms. The occurrence of either diplopia or blurring of vision



without an ascertainable cause should be carefully investigated. There are cases in which, although a partial recovery occurs, yet the patient is greatly changed, and in those manifesting the paralysis agitans syndrome this change would appear to be permanent. In a case recently examined the distinction between it and Parkinson's disease could not be made without reference to the history of the illness. There was an absence of tremor which when present lacks the rhythmical character of this affection. Muscular rigidity was marked, as was also the characteristic posture, the wooden gait, the mask-like expression, the monotonous voice, the everted lower lip, and antepulsion and retropulsion. Mentality seemed unaffected. The future of these patients is one of helplessness and invalidism. The following case would seem to indicate the existence of a chronic form of the disease:

O., 44 years of age. Father died at 52 of pneumonia; mother is living in her seventieth year and is well except for glaucoma; two brothers and three sisters living and well, one brother died in France. He had the usual childhood infections and 19 years ago contracted lues. Since mild secondary symptoms there have been no indications of the disease. In January, 1920 had an attack of influenza; was in bed ten days during which time his temperature did not exceed 101 degrees, was delirious for several nights. There was headache with double vision for two or three weeks afterwards and he was very drowsy and lethargic. While this patient never regained his normal health, yet it was not until early in March that he noticed he was losing strength. Incoordination of the right arm and leg developed; there was also a right facial palsy which has since disappeared; the least exertion exhausted him; slurring of speech was of late occurrence. His most distressing symptoms have been weakness and vertigo. There was Rombergism and Babinski in both feet. Lumbar puncture showed normal pressure, 8 cells, negative Nonne, negative Wassermann both of blood and spinal fluid and a colloidal gold curve 1233431000; urine negative, blood pressure 128 systolic and 80 diastolic, hemoglobin 86 per cent, red blood cells 4,520,000, white blood cells 7,200. On May 25 the neurological examination was negative, aside from a questionable Babinski in

right foot. The history of the illness taken in connection with the serological findings indicates clearly lethargic encephalitis.

Diagnosis, especially of the abortive and ambulant types is a matter of great importance. The cardinal symptoms are somnolence, cranial nerve palsies and fever. The significance of lymphocytosis has been much discussed. It is generally accepted that it may occur, but it is the exception rather than the rule, and its absence does not invalidate the diagnosis. Marie believes that a moderate degree of lymphocytosis does not exclude the possibility of encephalitis, but if it should be marked or persistent the question would arise as to whether we were not dealing with a meningitis either of the tuberculous or syphilitic form.

The treatment of lethargic encephalitis with our present knowledge is of necessity empirical. Netter says that while benefit may result from the intraspinal injection of serum taken from a recovered patient, there is no evidence that an antibody appears at an early date in the blood, hence he does not advise this procedure. He insists that urotropin should be given by mouth so as to produce a continuous action on the nerve centres, which does not occur when injected intra-venously. Pilocarpin assists elimination of the virus, but it should be used in conjunction with adrenalin to counteract its depressing effect on the heart. He warns against the use of arsenic, having observed disastrous results following the employment of neosalvarsan. The treatment he has found most efficacious is the creation artificially of an abscess by the injection of from 15 to 30 minims of turpentine into the outer side of the thigh. The beneficial results he attributes to the stimulated activity of the bone marrow. Twenty-five years ago I found Dr. Bruce of Morningside Asylum, Edinburgh, using this method in intractable cases of acute mania. The employment of the nucleinates after this fashion has been for many years a routine procedure with me in manic-depressive insanity and dementia precox. Cases in which a high leucocytosis occurred offered a much more favorable prognosis than those in which there was no reaction. Dr. Bond has observed improvement after dental attention, thyroid therapy, and lumbar puncture. In none of my cases have I observed improvement fol-

lowing the use of urotropin. The only thing that has given a positive result is lumbar puncture repeated as frequently as the necessities of the case seemed to demand.

#### THE DEMENTIA PRECOX SYNDROME

The adolescent insanities (manic-depressive insanity, paranoia, and dementia precox) are a malevolent triumvirate. Perhaps of these the syndrome of dementia precox is the least clearly defined and the most chaotic. A decade ago paranoia was believed to be a relatively common psychosis; careful observation, however, has shown us that it was not paranoia but the paranoid forms of dementia precox which were of frequent occurrence. Paranoia simplex, a definite clinical entity, manifests no hallucinations and is of rare occurrence. A distinguishing characteristic of manic-depressive insanity is a recovery from the individual attack with a diabolic tendency to recurrence. A fundamentally defective mental mechanism, a failure in biologic adjustment is basic in all these psychoses, the initial fault being most marked in paranoia and dementia precox. Wolfshon reports finding an hereditary factor of 90 per cent in the latter. White believes it plays an uncertain role. There are also evidences of morphologic deviation. While these insanities were not unknown to Pinel and Esquirol, Morel first used the expression precocious dementia. It was Pick, however, who introduced its Latin equivalent dementia precox, which clouds rather than clarifies its meaning.\* The term precox is unfortunate, but it no longer misleads if one accepts White's interpretation that it is precocity of dementia, not a precocity of age. The syndrome is likewise unfortunate containing as it does many symptoms common to the insanities in general.

Hallucinations, especially of the sense of smell (Savage) and loss of memory notably for recent events are common in the senile psychoses. Katatonia is seen not only in juvenile insanity but in organic conditions as well. Bond reports the occurrence of katatonic symptoms in epidemic encephalitis. Last winter an involutional psychosis under my care developed a

katatonic stupor which subsequent observation showed to have been due to an encephalitis. The usual classifications of dementia precox are academic rather than real. They are arbitrary, confusing, and unnecessary. The symptoms vary greatly, depending upon the time when the mental mechanism is involved in the course of its evolution. Thus those of the pubescent period are quite distinctive. The waves of depression and expansion are less marked, the delusions transitory, fragmentary and changeable, indicative of the patient's age. While those occurring during the process of and at the close of adolescence are in like manner characteristic, katatonia suggesting early or mid-adolescence, systematized delusions its close. Mixed forms occur in which symptoms common to all may be observed. Striking abnormalities of character and conduct at variance with the social order may be the results of the disintegrating influence in an abortive precox on the mental mechanism, perverting and crippling the higher faculties, thus evolving the radical, the parlor Bolshevik, the crank, the hobo, and the Magdalene. Prognosis is determined by the syndrome and the date of the development of the disease. Systematized delusions, if present, are of ill omen, recovery from the first attack may occur, but its duration is indefinite, recurrence follows and there is a steadily increasing dementia. Age possesses a real significance. Pubescence, because the mental mechanism is in the process of making, is most to be feared. Adolescence is more favorable, and the adult life is distinctly so. Recovery is at the minimum in pubescence (8 per cent); greater in adolescence (13 per cent, Kraepelin), and in the adult it may exceed 50 per cent. The British Medical Journal was moved to protest by the astonishing report of Dr. Beaton of the Royal Navy that he had observed 50 per cent of recoveries in dementia precox. If by recovery one means the getting over an attack occurring in late adolescence or adult life in which systematized delusions were wanting, Dr. Beaton's percentage of recoveries was far too small. Experience has taught me to expect this in a majority of these patients after an illness of four to eight months' duration. The clinical syndrome is quite characteristic. The attack may occur without warning; on the contrary it may masquerade as a manic-depressive

\*The same criticism applies to Bleuler's term schizophrenia which indicates a splitting or cleavage of personality and since this occurs in other forms of insanity as well as in the neuroses Dercum believes it should be rejected.



insanity for months or years, before the real nature of the illness is recognized. There may be a preceding insomnia, depression, irritability, erratic conduct, inability of adjustment; elation may alternate or commingle with depression. Mental confusion may be very marked. The delusions are agonizing in character, the hallucinations terrifying, impulsive acts common, and suicidal and homicidal tendencies are almost invariably present. Stupor, catalepsy, posturing, mutism, negativism, grimacing, veridicalization and stereotypy are among the cardinal symptoms. The more acute the attack, the less the probability of mental deterioration. I have known patients to scream out definite sentences at the top of their voices for five consecutive nights and days with the regularity of a fog horn. The stupor is only apparent, not real. After a stuporous attack these patients will describe in minute detail every little happening. One of my cases portrayed in a most amusing manner his observations during a stupor, of the the Romeo and Juliet scenes as acted by the male and female nurses in charge of his case. It is not an attractive picture, yet out of this physical and mental chaos health and sanity may emerge.

The following case illustrates not only the character but also the toxic origin of the precox syndrome: Mrs. S. 51 years of age, mother died of cancer; father of paralysis; a sister insane, one brother and one sister living and well. Two sons both well. Never ill until two years ago when she lost weight, became irritable, and very nervous. September, 1918, the superior thyroid artery was ligated for hyperthyroidism; March, 1919, was operated on for goitre. Two months later she became suspicious, sleepless and acted peculiarly. Delusions variable, changeable, and unsystematized developed. She was acutely excited, noisy, mentally confused, refused her food and was untidy. She was subject to attacks of weeping and depression. Her hallucinations of sight and hearing were terrifying, especially those of hearing. There was posturing, grimacing, senseless laughter and mutism. Hemoglobin 65 per cent, red blood cells 4,050,000; white blood cells 7,200; blood pressure 132-78; pulse 150. Urine contained albumin and white blood cells, no casts. She recovered completely after six months' illness, gaining 23

pounds in weight. The metabolism test was +10.

Evidently the endocrine disturbance was the active factor in this patient's illness. Dana believes that gland defect is sometimes present in the psychoses. Kraepelin suggests a toxic origin. The investigation of Mott would indicate that its source was the sexual glands. Enlargement of the thyroid gland occurs with suggestive frequency in dementia precox (Dereum). Infections and cerebral trauma play an etiological role. An illustration of the former is seen in Mrs. V. a young married woman 31 years of age, always nervous and inclined to worry; except for two confinements had never been sick. December, 1919, she had an appendectomy and a cystic ovary removed. Operation for an infected gall bladder was deferred because of excessive nervousness. Twelve days later she became depressed, irritable, sleepless, and was given to spells of silly laughter. It was at this time I saw her. There were four abscessed teeth and septic tonsils; grave sepsis occurred along with septic arthritis, most of the joints being involved. The psychosis which was distinctly that of a precox type ran a stormy course. She made an excellent mental recovery after an illness of eight months' duration. The dementia precox syndrome was a common form of the psychosis that occurred so frequently after influenza in the never-to-be-forgotten year of 1918-1919. An instance of cerebral trauma\* is that of a Montana ranchman whom I saw five years ago. His team ran away, he was thrown to the ground and a wheel of the wagon ran over his head. After the immediate effects of the trauma had disappeared he developed a typical clinical picture of dementia precox.

An interesting feature of these cases is that after months of seemingly hopeless illness *all* symptoms may disappear with a startling suddenness, the patient being able to return home within a week or ten days, apparently perfectly well.

As in the preceding conditions, treatment is empirical. All sources of infection should be removed. More than twenty years ago Sir Thomas Clouston advised the use of the thyroid

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\*Instead of traumatism being the indirect cause some would regard this as a case of latent dementia precox liberated by the cranial injury.

gland in insanity. The administration of the extract of certain ductless glands or of the mixed glands is a routine procedure. That of the pituitary body has seemed to me to have a distinct value. Injection of the nucleinates is worthy of trial.

Dementia precox, like hysteria (Lasague), is a waste basket in which are cast all the psychoses of which we are unable to make the diagnosis; not only does it include those individuals in whom the initial life impulse, being defective, fails to attain Nature's expectancy, to round out a normal life cycle, but includes as well a wide range of cases not found in our classic conception of the disease, thus offering a more hopeful prognosis than was ever conceived of by Morel and Kraepelin. Hallucinations, loss of recent memories and katatonia can no longer be regarded as distinctive symptoms. In many instances, the delusions, hallucinations and mental confusion are indicative of a toxic psychosis rather than a precocious dementia with a background of neuro-degenerative taint, or a failure in the evolution of the organism with glandular defect and a faulty metabolism.

Both in the psychoses and the neuropsychoses the primary weakness lies in the neural mechanism. Under certain conditions, which include environment, emotional stress, trauma, glandular defect, infections, etc., the resultant reaction may be on the one hand either a psychosis degenerative in character, such as paranoia or dementia precox, or possibly one more benign in nature with an ever-wavering mental balance as in manic-depressive insanity, or perhaps a psychosis temporary in duration and favorable of type, or, on the other, it may be a neuropsychosis. Symptomatology in insanity are protean in nature, inextricably interwoven and sadly lacking in distinctive characteristics. No Ariadne thread guides us through their confusing labyrinths. Syndromes are tentative merely, not pathognomonic. Only in this way can we satisfactorily explain the remarkable results reported by Dr. Beaton which my experience confirms but finds much too small.

#### DISCUSSION

DR. C. R. BALL, St. Paul: We are greatly indebted to Dr. Riggs for presenting so well these three very important subjects in neurology. I am particularly glad he has called the attention of the members of this section to the use of luminal in the treatment

of epilepsy. About nine years ago, after reading the report of a number of cases of epilepsy treated by means of luminal in the *Muenchr. Wochenschrift* I began to make use of this drug in my epileptic patients. In my opinion luminal gives the best results in epilepsy of any of the remedies which I have prescribed. It also has the advantage of being freer from deleterious results than the bromides. Rarely one sees a dermatitis as a result of the administration of luminal but this may be said to be of very rare occurrence indeed, especially in the small doses which are used in the treatment of epileptic patients. I have given luminal in doses of one and two grains three times a day to the same patient over a period of years and then suddenly taken this patient off from the luminal without noticing any of the nervous disturbances such as follow the sudden withdrawal of habit-forming drugs. From my experience with it, I do not think patients are in any more danger of becoming luminal addicts than they are of acquiring a bromide habit. My observation in patients taking both of these drugs is, the longer they take them, the more pleased they seem when they are discontinued just as patients usually are at the discontinuance of any other medication.

So we may feel that in the use of luminal in the treatment of epilepsy we have a very valuable new remedy which can be safely and effectively administered to our patients over long periods of time.

In the three subjects, epilepsy, encapalitis and dementia precox, we do not detect a similarity in nomenclature, but if we consider their symptomatology and especially their pathogenesis, their relationship to each other is clearer. This is particularly true of epilepsy and dementia precox. They are enrolled under the same great grouping of the psychoneuroses, the great majority of cases occurring in persons heavily burdened with a bad nervous inheritance. Delusions, hallucinations and a demented state are often terminal conditions and both are quite prone to making their appearance at or about the age of puberty when the sex glands are taking their place as active factors in the endocrine system.

Dr. Riggs has well said that the pathogenesis of these two diseases,—epilepsy of the idiopathic character and dementia precox, is a disturbance of the normal mechanism. I think he would be justified at the present time in going a step farther and saying that this mechanism to which he refers is to be found primarily in the sympathetic-endocrine system.

Just a word in regard to the analogy of the encephalitis cases: Many of them after the passing of the acute stage are left in a condition which bears a striking similarity to the catatonic state so often occurring in dementia precox. Is this catatonic state entirely due to the effects of the encephalitis or has the toxin which produced the encephalitis involved also elements in the sympathetic-endocrine system? Considering the close association of the brain and its membranes to the pituitary gland, I think the latter supposition a likely one.



DR. S. MARX WHITE, Minneapolis: The three things Dr. Riggs discusses in his paper have another thing in common, and that is our almost total lack of knowledge of gross and microscopic pathology and particularly of pathologic physiology. It is for that reason that they must be discussed so largely from the functional side. However, concerning one of them, the present methods of deadhouse (how I hate that term) pathology are bringing out a great deal of knowledge as a basis for certain of the manifestations, and there is at this point one very important thing that I think can possibly be aborted by an increase in our deadhouse pathology. We are today, I think, without even a clue as to whether these forms of encephalitis that we have been seeing in epidemic form in groups, are the same condition that we see sporadically and have been seeing sporadically for a good many years. We have not enough knowledge of these interepidemic forms to say whether we are dealing with the same thing or whether we have a different condition, but there are sporadic cases of what newspapers call "sleeping sickness", individual cranial palsies, or some closely related groups with palsies, and in all of that group it is important to learn whether the pathology of these—to speak nothing of the etiology, of which we know so little—is a common one. For that reason I would like to repeat what I repeat very often, and that is a plea to the general practitioner who sees most of these cases to insist upon the opportunity for autopsy in all of these aberrant encephalitis types and the interepidemic group. In the encephalitic group one of the striking things is the number of cases with aberrant symptoms, during the epidemic period the number of cases we see with a single palsy. Another group that interests me because of the fact that we are dealing with encephalitis, in which we have no lethargy but active mental symptoms or sometimes delirium,—is those rare cases without mental symptoms with cranial palsies. I want to emphasize one particular thing in that group, and that is a prolonged rest. I think that just as in the cases of severe cranial injuries, concussion or fractures, it is necessary to emphasize the need for long rest periods. That period should be too long rather than too short. It is common to allow these patients, as soon as the symptoms have disappeared to resume active life and I have seen cases of relapse as a result of this procedure. Brain tissue, as we all know, recovers with extreme slowness, and it is essential for complete recovery that a long period of rest be given. I have seen some temporary improvement after the procedure Dr. Riggs mentioned of lumbar puncture, but I have never seen any permanent improvement afterward and doubt if such a procedure could have any permanent influence on the condition.

DR. T. L. BIRNBERG, St. Paul: On looking over this program I see that "bromides are in the discard", and I rise on account of that. It certainly makes me feel badly to have a brain child discarded that had served us so long and so faithfully. How-

ever, before we discarded this brain child and make a step-child of it, and put another child in its place, let us put a little more thought on the subject. By bromides we mean a combination of bromine with some other substance, as sodium, potassium, calcium, or magnesium. This gives us a combination of many kinds. If we do not get results from one, oftentimes we try the others. Of course, my remarks are from a very limited field,—the diseases of children,—and so you must take that into consideration. However, when you combine drugs like sodium or potassium with bromine, you are making a mistake, as sodium and potassium are stimulants, and when we combine a stimulant with a sedative, we immediately defeat our purposes, at least in a measure. Calcium and magnesium salts are sedatives, so we should try to combine two sedatives,—calcium and bromine, and then we have a drug that has served us for many years and can be expected to give results.

The word epilepsy is simply a word that means nothing from a diagnostic point of view. It is a symptom that may include many different diseases of different origins. In children, epilepsy so-called, is usually a metabolic condition and in the treatment we try first, if we have sufficient skill, to find the cause. We treat the case and get results from treating the cause and not the symptom; any doctor who cures epilepsy with bromides is the same kind of a doctor who treats arthritis with aspirin. There are two kinds of doctors: those who think and those who dispense pills (laughter), and so in using the calcium bromide we simply use something to help us along while we are proceeding to find the real cause of our trouble. Calcium bromide has been a faithful child to us. There are a few things about calcium and about the bromides,—a few of which I will mention. Children tolerate them very nicely and they almost never have a bromide rash in infancy or childhood. I never knew why this was until I was told that the bromides only cause acne in adults because the sebaceous glands, during certain periods of adult life, are not functioning properly, and so now we can understand why in adult life we have so much acne from the bromides and so little of it in infancy and childhood.

Another factor about our friend bromide is that its action can be greatly assisted by proper diet. You must remember that if you put a patient on a diet without salt, or with very little salt, a small dose of bromide will go a long way,—therefore, in using bromides we should use a salt-poor diet.

A third factor is rest. This thing was worked out very nicely in the Pirquet clinic. They kept a child with epilepsy under observation and recorded the number of convulsions. Then they put the child to bed and found that with the same drugs and other therapeutic measures and diet—but with rest—the number of convulsions was much less.

And so I wish to add to the assistance of our brain child,—the bromides, rest and a salt-free diet.

Another factor to be remembered is that there are

other sedatives, magnesium and calcium salts. How can we diminish the irritability of our nervous system? Giving some lime or magnesium by mouth might help the druggist but would not help our patient very much. There is plenty of magnesium and calcium in all the food we eat, if we could absorb it: We do not absorb it, and, therefore, we should do something to help the patient to absorb the calcium salts supplied by the food. We have a method of assisting the absorption of calcium in the tissues. That is by administering phosphorous dissolved in cod liver oil.

DR. C. EUGENE RIGGS, St. Paul, (closing the discussion): The purpose of my paper was eminently practical. We all treat epilepsy; its therapy is not confined to my speciality. As far as Dr. Birnberg is concerned, he is perfectly right in his defense of the bromides. I do not think bromide should be placed in the discard, but I think we have a substitute in a majority of the cases which is ever so much more effective.

As to encephalitis, those of you who were overseas know what it was over there. Those of us here trying to do our work and your work and help bear your burden, know what we passed through here, and I tried to give a resume of the best method of therapy at the present time. I certainly believe that the lumbar puncture is far superior to anything else we have today. I think it takes out the toxic materials along with the spinal fluid and at the same time flushes the canal with antibodies which have a certain therapeutic value.

You know only too well, when you see a patient has dementia precox, it means a practically hopeless prognosis. What I wish to impress upon you is that there is a class of symptoms that is included in the syndrome of dementia precox that most likely is a form of toxic insanity and it does not have the hopeless outlook nor stigma of this unfortunate disease. Fifty per cent or more of these patients recover.

## FACTITIOUS TOXICITY OF PREVIOUSLY SIMPLE GOITRES\*

From the Material of the Duluth Clinic

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For centuries previous to the discovery of iodine and its identification as an element in 1912, there had been used in the treatment of various forms of goitre, throughout the known world, certain marine derivatives such as powdered and burnt sponge, calcined corals, and "aethiops vegetalis," all of which contained iodine in appreciable amounts. In spite of the

short waves of popularity of other forms of treatment, such as the application of toads to the swelling, the various charms and incantations directed against goitre, and even that universal panacea the King's Touch, administration of some form of iodine continued, throughout the ages, to be the most successful of all methods of curing struma.

With the introduction of the numerous salts and solutions of metallic iodine, impetus was given to this treatment, because of the availability of the medicine and its occasional magical results, and this popularity increased to a point where both physicians and laymen were familiar with its curative power. Until comparatively recently every type of goitre in certain parts of this country has been treated at some time with iodine, and this course has been recognized as correct practice by many text books. In fact the summing up of the medical treatment of goitre, as held by a great proportion of practitioners, can be said to have been the use of some form of iodine.

Since the publication of the remarkable studies of pathologic thyroids made by Wilson, much light has been thrown upon the possibilities of harm, under some conditions, by this type of treatment, and it is the purpose of this paper to call attention to the continuing prevalence of a careless disregard for the immensely important effects of this drug, when given without an understanding of what may be grave disaster to the patient.

The excellent results of iodine medication in the simple types of goitre, more especially the adolescent and pre-adolescent varieties, have been attested for years, and it is probable that here the drug has justified the general confidence in it. If evidence to this effect was formerly based upon unscientific and empiric grounds, the late researches of Marine and Kimball have definitely proven that iodine, in the form of one of its salts and probably in many of them, will not only cure but, to a large extent, prevent goitre of these types.

In view however of the fact that, after the adolescent period, a thyroid enlargement, even without symptoms, may be, nevertheless, one that contains the essentials of toxicity, it is well to consider what forces may produce this untoward result. In the first place it is not to be

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forgotten that even in the supposedly simple forms of struma, many observers have noted areas, scattered and relatively small, throughout the growth, that showed evidences of hyperfunction, in that the epithelial lining of the acini was reduplicated, the vessels tortuous and thin walled, and also with more or less papillary formation in the alveoli;—and yet withal these goitres have given no symptoms of toxicity. These findings bear out the statement of McCarrison, who remarks that there are few human beings living under modern conditions of life, in whom the thyroid is wholly normal. It seems also established that animals of several kinds, are also subject to wide variations in degrees of thyroid hyperplasias, especially those creatures confined in limited spaces and in close association with man. It is more than possible that the active hyperplastic areas that the pathologist observes are insufficient in size and bulk to produce a toxicity sufficient to give rise to clinical symptoms of a known type, and it may also be that any small excess dosage of thyroid hormones from these areas, can be neutralized by the balancing and protective forces of other glandular structures of the body providing no unbalancing agent is introduced.

The remark of Ewing<sup>4</sup> is particularly pertinent in this connection. He says "An important principle governing pathological processes in the thyroid, is the remarkable response to functional stimulus, and the wide variations in functional activity and structure of the gland in the different physiological states. Marked cellular hyperplasia may readily be induced by changes in diet and by drugs." It is conceded that certain investigators have declared that the administration of iodine causes a "resting state" of the gland, but our clinical experience certainly does not bear this out as a characteristic result. On the contrary we have seen repeatedly, symptomless goitres hasten to a well defined toxicity, and already toxic cases both partially hyperplastic, and the adenomatous, made more toxic by this drug.

In our present state of knowledge, no amount of clinical acumen will enable us to determine the existence or extent of these excitable areas in goitres that have given no symptoms of hypersecretion; no accuracy of history-taking will enable one to have knowledge of a long forgotten

previous activity of the thyroid. If a patient presents himself without notable increase in the basal metabolism, without tremor, tachycardia, sweating hands, loss of weight and strength, digestive and intestinal crises, the diagnosis of simple goitre is made and too commonly iodine is administered. Such a course certainly does not take into account the above mentioned pathological facts, and may precipitate a period of grave danger to a patient.

From the available literature on the action of iodine upon the thyroid gland, Crotti<sup>5</sup> considers that two facts are probable, first that iodine activates the functional activity of the epithelium, and that it also accelerates liquifaction of the colloid. It also seems fair to include with this statement that certainly this drug does hasten absorptive processes in general. What worse drug could possibly be given in a condition where the pathologic condition of the gland cannot be accurately determined before hand? Aside from the possible presence of the small hyperplastic areas that are admittedly of fairly frequent occurrence in clinically inactive goitres, there is besides the very common adenoma of the thyroid, giving no symptoms for many years after the enlargement of the thyroid is noted, but potentially toxic. Can the encouragement to rapid absorption from these areas, and the early instead of the late, instigation to degeneration in other organs, be considered anything but the gravest of mismanagement?

It has been long known, but partly forgotten, that in some instances toxicity was rapidly produced by this agent. The literature abounds with dramatic examples. It was the similarity in action of thyroid extract and iodine that led Kocher in 1895, to suggest that the extract of the gland might be found to contain iodine, which all the world now knows to be a fact. Roos, in 1899 showed that there was a direct relation between iodine content and the effect of thyroid on metabolic processes, and Halstead's experiments seem to confirm the opinion that iodine either supplies or stimulates increased output of the gland substance. Breuer, quoted by Crotti, called the condition of toxicity caused by iodine the "iodine-Basedow," since the effects were usually those of exophthalmic goitre, headache, irritability nausea, vomiting and later delirium. Kocher<sup>6</sup> as long ago as 1916 called

attention to a rapidly occurring hyperthyroidism, occurring in cases of simple goitre treated by iodine, and Crotti again in the last edition of his book says, "Every surgeon who has had some experience in goitre surgery has seen, I am sure, more than once, these artificially produced cases of Graves disease, caused simply by an untimely, exaggerated, and unintelligent treatment with iodine or its compounds."

If these authorities had substituted for the expressions "Graves disease" and "Iodin-Basedow" that of "thyrotoxicosis" we could find our opinion in entire accord with theirs. For it is a fact easily demonstrable beneath the microscope that these glands do not present the general and widespread hyperplasias and hypertrophies that are necessary corollaries to the diagnosis of Graves disease according to our best pathologists; nor do these patients ever, as far as the author is aware, show a true exophthalmos, however much in other clinical expressions they may be similar.

Excluding the quiescent and abortive forms, and the commonly known comparatively inactive periods of true exophthalmic goitre, it seems certain from these facts that it is possible to secure from small hyperplastic areas of a gland, treated by iodine, the quantitative toxicity that resembles a true Graves disease. It is equally certain however, that though these results may be achieved in an extreme grade, that grade does not, in our experience, reach the limits of toxicity or the quality of that disorder, (Graves disease) in all regards. That is, while tremor, loss of weight and strength, tachycardia, and nervousness may be severe in each condition, the author has not seen in any case of activation by iodine, the production of an exophthalmos, excepting where there might be a reasonable assumption that the goitre had been a true exophthalmic one, in some stage or other before treatment had been instituted by the drug. Our findings in the laboratory also confirm this view of the toxicity produced. In no case of previously apparently simple goitres, in which toxicity appeared after the use of iodine, was there found the characteristic general changes in the gland described by Wilson as necessary, before the case can be considered a true Graves disease. These glands were generally larger than the true Basedow gland, by gross examina-

tion not so dry or granular throughout, and under the microscope the changes in the cellular elements were confined to small areas. But in these areas there was evidence of great activity, vigorous hyperplastic areas in the alveoli, with reduplication of the lining cells and even papillary formation, together with the characteristic increase of blood vessels and thinning of their walls.

To the work of Plummer we owe much that we know, of the clinical relationships of toxicity of adenoma of the thyroid, and he has shown us the effects of this type of goitre, as lasting over an average of about 14 years under ordinary conditions of life, from the beginning of the goitre, until the process is sufficiently advanced to send the patient to the diagnostician. It seems to us certain that the unwise administration of iodine to these patients during the years when their goitres are not particularly active, has materially shortened their period of comparative safety, and that instead of coming with beginning indications of degeneration in heart and blood vessels, at about 36 years, many will show far earlier than this, advanced injury to the circulatory system, if iodine has been extensively used. Here the drug seems to augment the ease of absorption from the adenomatous areas and a quantitative poisoning easily occurs.

In our clinic the type of individual coming for the treatment of her increasing symptoms, is generally a young female, from 16 to 30 years of age, in whom a desire for a better cosmetic appearance, has led to her receiving iodine in some form. They characteristically have a goitre, rapid heart, increased blood pressure readings, some type of goitre skin, sweating hands and tremor, together with much increase of appetite and of nervousness. They have no exophthalmos and none develops. Their history reveals no evidence of symptoms of any kind referable to the goitre, until after iodine medication, over varying periods. An increasing number of these cases are seen, we believe, because certain manufacturers of iodine-containing patent medicines, have found a ready sale in the last few years for their product, in our part of the country, (which is notable for the incidence of goitre in a considerable percentage of native born individuals.)

As our interest in this type of goitre is clin-



ical and surgical rather than pathological, we state that our opinion regarding the advisability of treatment, is entirely in the direction of surgical reduction in the areas supplying the toxic products. After withdrawal of the stimulating drug, we commonly perform a double partial lobectomy, either by the method of Balfour,\* (used for large and unwieldy growths), or in goitres of moderate size, the old Kocher operation with free drainage, leaving behind the posterior capsule and a varying amount of thyroid tissue with it, as the individual case seems to demand. We have seen no degree of toxicity in any instance, that we have felt required the preliminary vessel ligations so important in exophthalmic goitre. Still, even with gentle, careful, rapid and well drained radical operations of this kind, occasionally a three day reaction from the procedure will ensue, in which the tachycardia, tremor and restlessness will be of a grade approaching that seen in operations during active stages of hyperplastic goitres. However, the factitious type of thyrotoxicosis has usually a sounder and less impaired constitution to aid it during the brief convalescence, and after about ten days these patients are usually ready for discharge from hospital, and many leave in a shorter period. We have operated upon fifty of these cases, within three years, and none have died.

At a later period a clearly defined group of this type of goitre, entirely of the adenomatous type, will possibly be presented, and in this an attempt will be made to adduce evidence to prove that after the free use of iodine, the period of freedom from indications of toxicity, and degeneration of other organs, is less than the classic period of their natural history, as set forth by Plummer.\*

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## DISCUSSION

DR. C. H. MAYO, Rochester, Minn.: Dr. Chapman's excellent paper very completely covers the ground with reference to "the iodine heart" mentioned by Kocher many years ago. We do not know what causes goiter. I understand it is believed something in the geologic state of certain parts of the country exhausts the iodine causes goiter, but if this were true why are so few people affected and such a large proportion of them females? The gland converts to use the iodine out of food. Some persons with myxedema cannot absorb iodine with their intestinal cells. Give them iodothyron by mouth and they are unaffected; give it intravenously and they pick it up right away. Some types of pyogenic infection have been found in the thyroid, principally the diphtheroid bacillus.

There is a certain type of goiter, for example in girls at adolescence, for which we should give iodine in prescriptions, as demonstrated by Marine. A woman of 55 or 56 with long standing goiter has little trouble from the goiter but finally goes to a physician who puts her on iodine and the result is an iodine goiter heart. The iodine stimulates these long-standing goiters. I use the term "thyrotoxic" goiters for the cases of adenoma with hyperthyroidism.

DR. T. L. CHAPMAN, Duluth: I have nothing further to add except to thank Dr. Mayo for his discussion.

## FRACTURES OF THE BASE OF THE RADIUS\*

(Colles' Fractures)

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One of the most common causes of disability which the general surgeon has to treat is the fracture of the base of the radius, generally known as Colles' fracture.

This injury was universally considered a dislocation previous to 1783, when it was first described as a fracture by Pouteau. Little attention was given to Pouteau's views, and fractures at the base of the radius were still considered dislocations in 1814 when Mr Colles accurately described the condition as a fracture, but did not gain proper credit until after his death. The Dublin surgeons seem to have been the only ones willing to accept Mr. Colles' views until about 1830, when the burden of proof seems to have shifted to the man who said

\*Read before the Clinical Club of Minneapolis, November 4, 1920.

there was no fracture and Colles' views were almost universally accepted.

During the past ninety years discussion upon this subject has been largely limited to the details of causes, types, and treatment. With the advent of the X-ray a few years ago, considerable light was thrown on the subject, but a cursory glance at recent surgical literature will show that discussion upon the subject is by no means ended. The cause of this injury is generally conceded to be extreme dorsal extension due to a fall upon the outstretched and extended hand; the ligaments are more resistant than the bony tissue, which consequently gives way. Stevens,<sup>1</sup> in a recent extensive discussion, lays great stress upon the compressive nature of this fracture and shows that the shortening of the radius results from actual loss of substance due to compression and destruction of tissue rather than from impaction. Troell,<sup>2</sup> of Stockholm, in a careful study of over 200 cases concludes that they are compression fractures, or a combination of compression and extension fractures.

In a series of thirty-five personal cases collected while Assistant House Surgeon at the New York Hospital, when the late Dr. Stimson was consulting surgeon, the writer attempted to account for the variations in type which these cases present, by taking a more careful history of the injury and manner of falling; but the nature of the accident renders it nearly impossible for the patient to describe it other than as a fall upon the outstretched hand.

The usual textbook description gives the impression that these fractures present one type with slight variations and they are consequently treated alike with the usual bad results, more so than with any other fractures. Colles originally described it as a fracture which takes place about one and one-half inches above the carpal extremity of the radius. Seudder,<sup>3</sup> under the heading Colles' Fractures, says that a fracture of the lower end of the radius within one inch of the articular surface is common in adults. In discussing the associated complications no mention is made of the fractures involving the radio-ulnar and radio-carpal joints, although pictures are shown presenting these conditions. Jones,<sup>4</sup> of Liverpool, says, "In its typical form the radius breaks about three-

quarters of an inch from the lower end, the lower fragment being displaced backward and usually rotated toward the ulnar side." Troell,<sup>2</sup> divides these fractures into nine groups based upon the anatomy. Stimson's<sup>5</sup> last edition places the Colles' fracture at from one-third to three-fourths of an inch proximal to the articular border and mentions the fact that it is often comminuted.

Numerous writers have called attention to the wide variations in these fractures and a distinct step in advance was made in the Bellevue<sup>6</sup> nomenclature, which is being widely adopted at present, in dropping the term *Colles' Fracture* and substituting for it, *fracture about wrist joint*, thus calling attention to the necessity of different and individual therapy.

Hitzrot<sup>7</sup> called attention some years ago to three common types into which these fractures may be divided, a classification which has proven very helpful from the standpoint of prognosis and treatment. (See Figs. 1 and 3).

*A type* follows the line of ossification between the diaphysis and epiphysis and is about 1.75 to 2.25 cm. above the radial styloid.

*B type* has the line of fractures entering the radio-ulnar joint.

*C type* is 3.75 cm. or more above the tip of the radial styloid and is found in young people.

In a series of twenty-one cases in the records at the University Hospital the following groups were found as shown in the chart. (Fig. 4).

From this chart it is seen that ten per cent of the cases are in the region described by Colles; that fifty-seven per cent lie in the region commonly described as Colles' fractures, and that thirty-three per cent lie below this

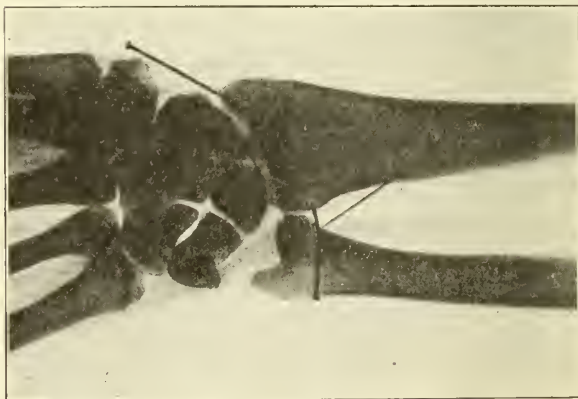


Fig. I



point. In addition, the radio-ulnar joint is involved in thirty-three per cent of the cases; the radio-carpal joint in forty-three per cent, and either one or both joints are involved in fifty-three per cent of the cases. In fifty-seven per cent the ulnar styloid is broken. It is obvious that the results can not all be the same, regardless of treatment; consequently in order to produce the best functional results the surgeon must study and interpret the x-rays and treat each case individually.

In the treatment of fractures and especially fractures at the base of the radius, the import-

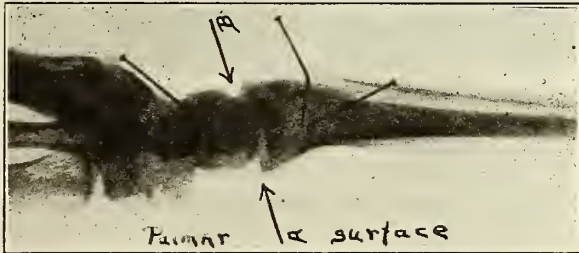


Fig. II

ance of early reduction under anesthesia can not be over-emphasized. Any one who has seen the conditions about the bone in recent fractures can readily appreciate the necessity of early reduction.

In operating upon several hundred compound fractures in evacuation hospital work in France, the writer was constantly impressed with the pathological conditions found about the ends of broken bone where the injury varied from a few hours to a few days old. Not only is there new bone formation on the second or third day, as pointed out by Macewen, but there is a pouring out of blood and exudate from the broken ends with rapid organization rendering accurate reduction difficult. There is also exudate into the surrounding muscles, fascia, tendons, ligaments synovial sheaths, and joint cavities, all of which must undergo absorption or organization. If one does not reduce early, this process renders bony landmarks obscure and if one waits for the swelling to subside, accurate reduction is seriously interfered with.

The New York Fracture Society agreed, March 7, 1917, that a fracture should be reduced within three hours, thus placing reduction of a fracture in a class with other surgical emergencies.

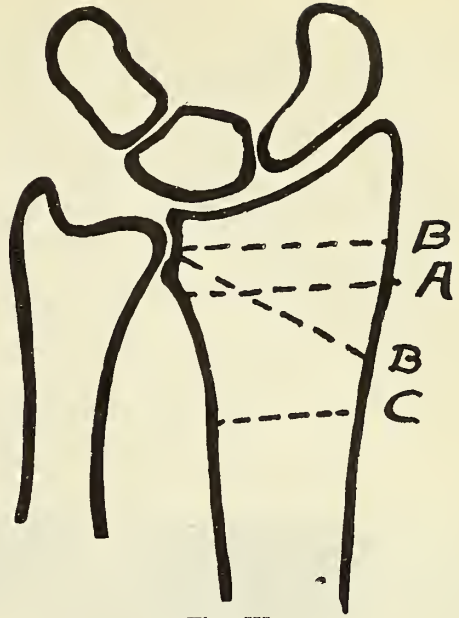


Fig. III

With anesthesia the muscle spasm as well as the pain is overcome and the surgeon is enabled to manipulate the fragments to the greatest advantage. Nitrous-oxide and oxygen is the most satisfactory anesthesia. If the anatomy of the wrist joint is recalled it will be remembered that the articular surface of the ulna is separated from the carpal bones by a triangular fibro-cartilage extending from the medial surface of the ulnar styloid to the border between the medial and distal articular surfaces of the radius. This cartilage is frequently perforated, thus permitting the escape of exudate in the B Type fracture into the radio-carpal joint. The radius, in its articulation with the os naviculare and os lunatum, forms the important part of the articulation of the forearm and the carpus.

The radial joint surface runs from behind forward and distally, (Fig. 2), so that in full extension the motion is limited by the lip of the posterior aspect of the radius. This inclination is altered in practically every fracture and the correction of the inclination of the radial joint surface is the chief failure in reduction (Fig. 5).

There are numerous methods of reduction, all of which have their place. The method which appeals to the writer in the majority of instances is that of grasping the affected extremity in the handshaking position and reproducing

| Type                |                            | Ulnar broken |          | Styloid unbroken |
|---------------------|----------------------------|--------------|----------|------------------|
| A                   | A line (pure)              | 8 or 37%     | 5        | 3                |
|                     | Secondary into wrist joint | 3 or 15%     | 1        | 2                |
|                     | Crushing                   | 1 or 5%      |          | 1                |
| Oblique line (pure) |                            |              |          |                  |
| B                   | Transverse line (pure)     | 2 or 10%     | 2        |                  |
|                     | Secondary into wrist joint | 5 or 23%     | 4        | 1                |
| C                   |                            | 2 or 10%     |          | 2                |
| Total               |                            | 2112 or 57%  | 9 or 43% |                  |

Fig. IV

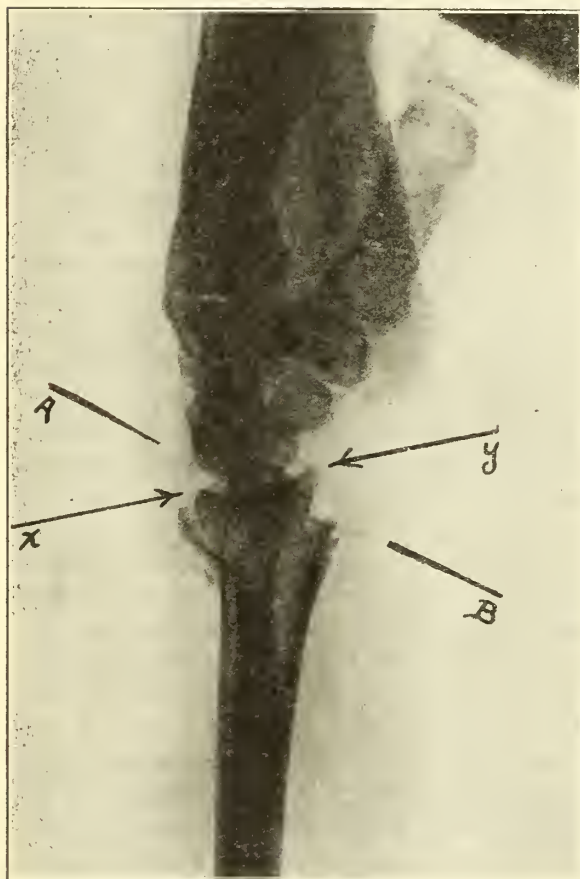


Fig. V

the deformity, with the thumb of the other hand at the lower end of the proximal fragment. When the fragments are at a right angle and the operator's thumb is in the angle, the distal fragment is brought down by a quick movement and the thumb in the angle slides down over the

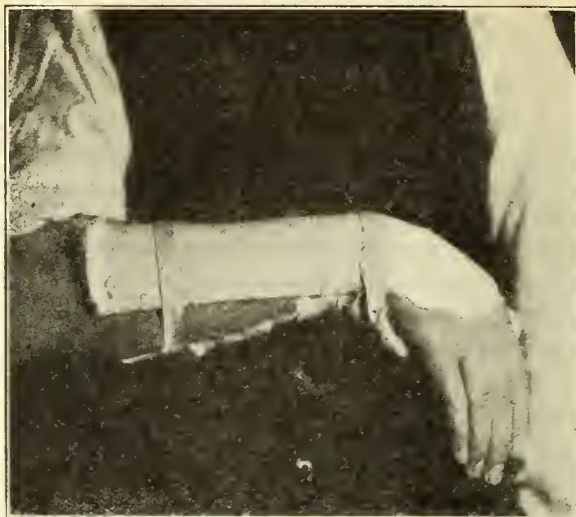


Fig. VI

line of fracture, preventing the recurrence of the displacement and insuring the alignment of the fragments.

The fracture having been reduced, the next question is one of splints and position. The molded plaster splint as devised by Dr. Stimson at the New York Hospital thirty years ago is without a doubt the most satisfactory and is far superior to any prepared splint. The position should be determined by the condition of the fracture, since no one position applies to all. In view of the fact that there is in all cases a shortening of the radius due to destruction of bone and in fifty-seven per cent of the cases a fracture of the ulnar styloid, the hand should be put up in ulnar deflection. In order to maintain the position of the radial joint surface, flexion at the wrist is a distinct advantage. Also in the flexed position the extensor tendons aid in maintaining the distal fragments in position. About three-fourths supination with the fingers absolutely free is most satisfactory. (Fig. 6 and 7). At the end of a week the hand should be brought out straight in a second set of splints, as too long maintenance in the flexed position prolongs the period of recovery.

The importance of baking and daily massage in increasing the blood supply and other healing processes in fractures is now generally recognized. The surgeon himself should give the massage during the first ten days, after which it may be done by a dependable masseur trained in fracture massage. With the plaster splints



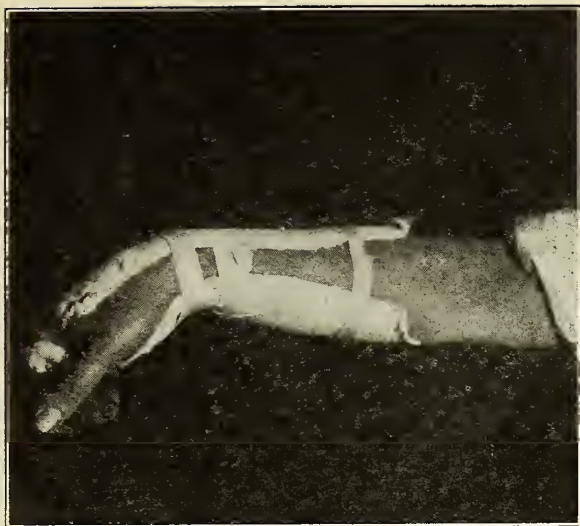


Fig. VII

the dorsal or palmar splint can be removed, and with one remaining in place massage can be given without danger. In the fracture involving the radio-ulnar and radio-carpal joints, early motion, performed by the patient under the direction of the surgeon, is essential to the preservation of the normal movements of these joints.

At the end of two weeks the palmar splints may be removed, as the fracture is well or nearly so; and in three weeks splints may be left off altogether.

#### CONCLUSIONS

Mr. Colles' connection with this fracture is purely of historical interest, and the substitution of the term *fracture of the base of the radius* will promote progress in study and treatment.

The fractures result from a combination of compression and extension and vary with the manner of falling and age of the patient.

These fractures should be considered as emergency cases and reduced at once under anesthesia.

The surgeon should interpret the x-ray plate himself and treat each case as indicated.

Deformity and impairment of function depend upon:

- (a) The character of the line of fracture.
- (b) The age of the patient.
- (c) The time of reduction.
- (d) The character of reduction.
- (e) After treatment.

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### MIXED TUMORS OF THE PAROTID GLAND\*

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In the treatment of mixed tumors of the parotid the best results are obtained in cases in which an early diagnosis is made and an early operation performed. In their incipency these tumors are small, usually definitely encapsulated, and only mildly malignant. A complete removal of the growth at this stage of its development will, in practically every instance, be followed by permanent cure, and the danger of injury to the facial nerve, the worst complication to be expected, is greatly diminished when the operation is performed at this time.

Mixed tumors of the parotid constitute a very small percentage of malignant tumors of the body. They occurred in only 0.062 per cent or in one of every 1,607 patients who were examined in the Mayo Clinic from 1915 to 1919. Mixed tumors are found about eleven or twelve times as often in the parotid gland as in the submaxillary salivary glands, and they practically never occur in the sublingual salivary glands. They occur with about equal frequency on the right and left sides and in males and females.

The incipient growth is a painless small

\*Presented before the Minnesota State Medical Association, St. Paul, October 1, 1920.

rounded or irregular firm tumor in the parotid which usually is discovered accidentally. If the tumor is left alone its growth varies; in some patients it is rather rapid, while in others the tumor does not seem to change in size for a number of years. Usually, however, at some time during the life of the patient it enlarges to a noticeable size. The patients in this series had noticed the growth from two weeks to forty years previous to the first operation. As long as the tumor remains encapsulated it is not highly malignant, but when its capsule is ruptured through trauma, through the growth of the tumor, or through an incomplete operation in which the entire tumor or capsule is not removed, and the cellular elements invade the tissues surrounding it, the growth usually rather quickly undergoes malignant change, and in some instances rapidly becomes a highly malignant tumor. With the rupture of the capsule metastasis is also possible and the parotid gland, with the muscles surrounding it, and the glands draining the region become invaded.

Pathologists differ with regard to the etiology of these tumors; many believe that they have their origin in fetal rests in the parotid which are encapsulated and which gradually grow. Wilson and Willis, after a study of the tumors of this nature which had been operated on in the Clinic up to 1911, believe that they are mesotheliomas. Some pathologists believe them to be carcinomas, and others, basal-cell epitheliomas. The tissue on the interior of the capsule of such tumors varies considerably; in some instances it is composed largely of epithelial elements, while in others tissue resembling cartilage seems to predominate; some tumors present a large amount of fibrous tissue. Often sections from different portions of the same tumor show very different microscopic pictures.

It is unfortunate that the parotid gland instead of the other salivary glands is so frequently involved. The condition is so slightly malignant in its incipency that were it possible in all cases completely to excise the parotid gland without the resulting facial paralysis, as is done when such tumors are found in the submaxillary salivary glands, the percentage of cures through surgery would be about 100. On ac-

count of the possible injury to the facial nerve many patients defer having the operation performed while the growths are small and thus lose the opportunity of having it performed at the time when the chance of cure is highest and the possibility of injury to the nerve is least. Because of this danger many patients are subjected also to an incomplete operation resulting in recurrence of the growth, and possibly loss of life. Unfortunately surgery seems about the only treatment which can be expected to cure these tumors, radium and x-ray having but little effect on them. The operation usually performed is as follows:

#### OPERATION

An oblique skin incision is made along the creases of the neck at a point about 1.25 cm. or 1.75 cm. below the angle of the jaw and extending from the lower portion of the mastoid process for a distance of about 5 cm. or 7 cm. toward the thyroid cartilage (Fig. 1). The skin and platysma muscle are then reflected and the parotid gland exposed. Often the tumor is found superficially placed and lying along the anterior surface of the gland. In such instances a transverse incision is made in the general direction of the fibers of the facial nerve through the parotid gland down to the encapsulated tumor, which is then enucleated by blunt dissection from the tissues surrounding it. If the tumor can be removed without rupturing its capsule permanent cure results almost always. Often, however, the capsule surrounding the tumor is very thin and is ruptured in an effort to remove the growth. In cases in which this occurs it is best to seize the edges of the capsule gently with forceps and with as little tension as possible by blunt dissection separate the capsule from the surrounding tissues, making every effort completely to remove it (Fig. 2). If the capsule ruptures and collapses after a portion of its contents has escaped, a small piece of gauze may be packed into the cavity in order to distend it and define its outline, thus aiding the removal. When the capsule has been removed thoroughly the cavity in the parotid gland (Fig. 3) should be washed with salt solution in order to remove, if possible, all the cellular elements which may have escaped. It is customary with us then carefully to swab the wound with Harrington's solution (a strong



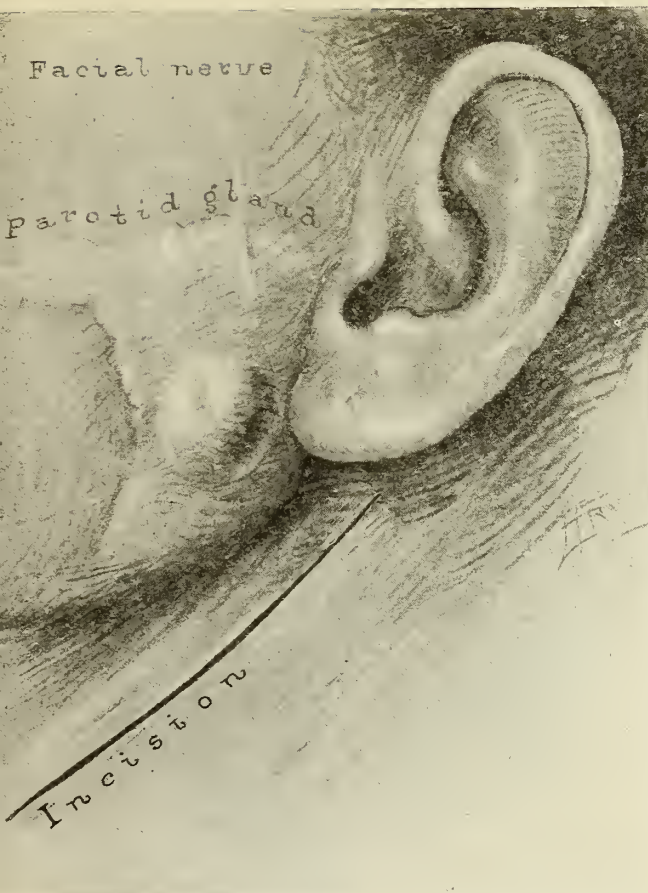


Fig. 1. Incision along crease in the neck which usually is employed in the removal of parotid tumors.

solution of bichlorid of mercury with hydrochloric acid in alcohol) in order to kill any cells that may still be lying free in the wound. The cavity in the parotid gland is packed with a small strip of gauze saturated with Harrington's solution; this pack is left in place for twenty-four or forty-eight hours.

When the superficial growth is removed by blunt dissection and no cutting is done except a small incision through the outer portion of the parotid gland in the direction of the nerve fibers, paralysis of the seventh nerve seldom occurs. In an occasional instance a temporary paralysis may occur as a result of the trauma to which the nerve is subjected during the removal of the tumor or from the pack which is left in the wound, but this usually subsides within from six weeks to a year after the operation. The paralysis which follows operation for these tumors usually occurs in cases in which the growth has attained a large size, or has

ruptured and involved the surrounding tissues, or has recurred following an incomplete operation. In the latter cases a large amount of fibrous tissue which is absent in the primary operation is usually encountered at the second operation, and it is often necessary to cut tissues which, ordinarily, could be stripped by blunt dissection in the first operation. In operating on some of the recurring growths and the larger growths that are deeply placed in the substance of the gland I have, in some instances, been able to save the nerve by the following procedure: I have exposed the facial nerve by first isolating the inframandibular branch of the nerve which runs along the angle of the jaw and dissected this upward through the substance of the parotid gland to the point where the facial nerve divides into the temporal and cervical divisions. The lower pole of the parotid may then be lifted up and a finger introduced between it and the nerve (Figs. 4 and 5). By this procedure the surgeon may feel sure that the enucleation is being carried on in a plane lying above the nerve and, although a temporary paralysis usually occurs from traumatism to the nerve, it disappears within a year.

#### RESULTS OF OPERATIONS IN 103 CASES

I have recently reviewed the histories of 112 patients operated on in the Mayo Clinic during the years from 1915 to 1919. Five patients who had inoperable growths on admission to the Clinic and who were treated with radium, three on whom an operation was attempted but could not be completed on account of the extent of the growth, and one who was killed in France during the war were discarded from the series in studying the results obtained through operation. This left 103 patients in the series. We have had recent communications relative to all except ten; eighty-five patients (82.5 per cent) are known to be alive and eight (7.7 per cent) are dead. Six patients (5.8 per cent of 103) of the eight patients who died are known to have died from recurrence of the disease; all six patients had extensive growths at the time of operation, the glands being involved in four. Four of the six also had been operated on one or more times elsewhere. We have no data regarding the cause of death of one patient, and in the other, death was supposed to have been

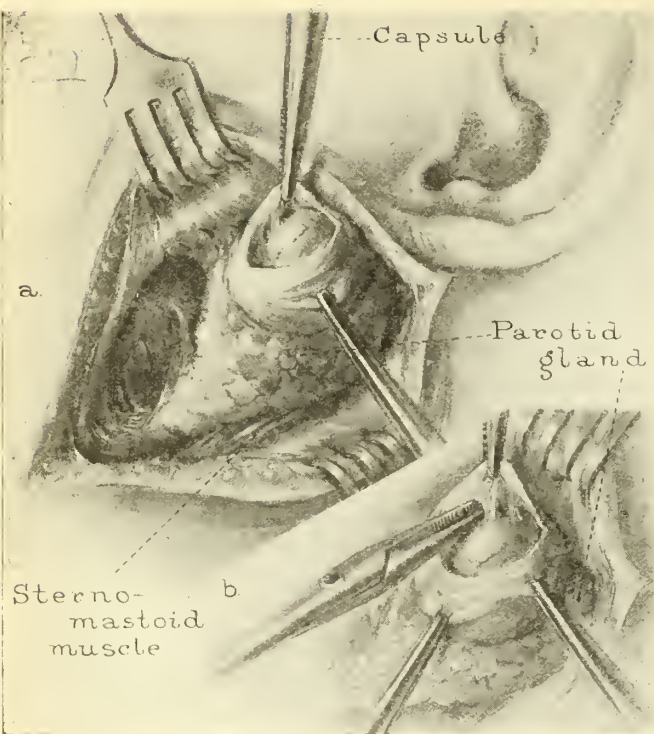


Fig. 2 a. Skin and platysma muscle reflected and the parotid tissue covering tumor incised in the direction of the fibers of the facial nerve. b. Enucleation of tumor by blunt dissection with a pointed hemostat.

caused by disease other than recurrence of the tumor.

A primary operation was performed for sixty-six (64.1 per cent) of the 103 patients. We have been able to obtain data with regard to the result in sixty of these. Fifty-six (93.3 per cent of sixty) are known to be alive and four (6.7 per cent) are dead. From forty-nine (81.7 per cent) we have recently received letters indicating that no recurrence has developed, from one to five years following operation. Eleven (18.3 per cent) are known to have had recurrences following operation; seven of these are alive with recurrences or have been operated on for recurrences, and four are known to have died; one probably died from disease other than cancer.

Thirty-seven patients were operated on for recurrences which had developed following one or more previous operations; thirty-four of these had been operated on elsewhere; three are known to be dead. Three of the patients were operated on for recurrences following one or more operations in the Clinic; one is known to

be dead. The tumor is known to have recurred in fourteen. Sixteen have been heard from recently and are supposed to be free from recurrence. Three patients may possibly have recurrences. We were unable to hear from four of these patients. All of the recurrences appeared within one year after operation. However, they may appear at a much later time. In many instances the growth of recurring nodules is extremely slow. We have operated on patients with small recurring growths that had been evident for some years.

It will be noted that the results following primary operations are better than results following operations for recurring growths; 93.4 per cent of the patients with primary operations are alive, 18.3 per cent have had recurrences and 6.6 per cent are dead, while 89.2 per cent of the patients operated on for recurring growths are alive, 37.8 per cent have had recurrences, and 10.8 per cent are dead. If all the primary operations had been performed for early and small growths the results would have been far better.

#### POSTOPERATIVE COMPLICATIONS

*Paralysis of the facial nerve.*—Four of the sixty-six patients on whom primary operations were performed presented themselves with complete paralysis of the seventh nerve which had been caused by pressure on this nerve by the tumor. In six patients the parotid gland was so extensively involved that it was necessary

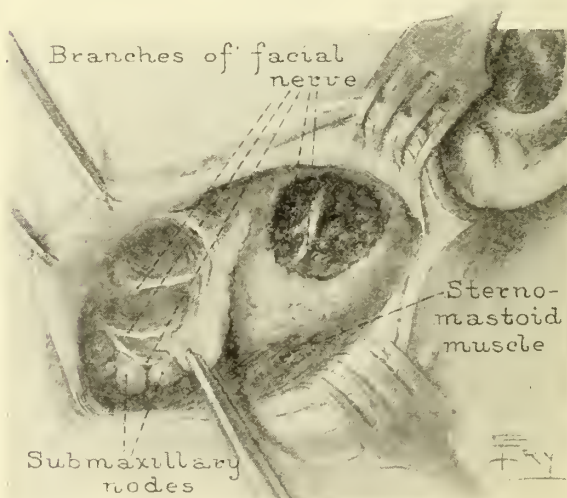


Fig. 3. Cavity in the parotid gland after removal of the tumor. Facial nerve in the bottom of the cavity.



completely to excise it, thus sacrificing the nerve. In sixteen patients a temporary complete paralysis of the nerve, which persisted for periods varying from six weeks to one year, occurred. One patient had a permanent partial paralysis and one a permanent complete paralysis. We were unable to obtain data from six of these patients as to whether paralysis had followed operation.

Four of the group of thirty-seven patients were found to have complete paralysis of the

which persisted for periods varying from six weeks to one year, while permanent partial paralysis resulted in five. We were unable to obtain data as to whether or not paralysis had resulted in three patients.

*Salivary fistulas.*—Two patients had salivary fistulas after operation. One followed a primary operation and the fistula has persisted for five years and nine months; in the other patient a fistula occurred following an operation for a recurring growth and this has persisted intermittently for two years. One patient came to us with a salivary fistula which had been present for seven years and which had occurred following removal of a parotid tumor.

In closing I wish to emphasize that early diagnosis and early operation are essential in dealing with mixed tumors of the parotid in order to minimize the danger of injury to the seventh nerve and to diminish the mortality.

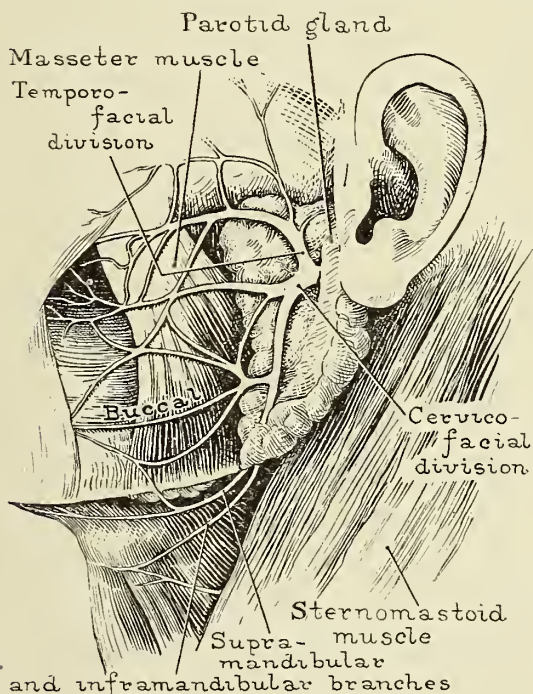


Fig. 4. Anatomy of facial nerve as it passes through the parotid gland. The anterior portion of the gland has been removed.

nerves at the time of admission; one other had a slight permanent paralysis and one gave a history of having had a complete paralysis following the operation which was done elsewhere, but this had entirely recovered. It was necessary to perform complete excision of the parotid in two of the cases in which the growth recurred; complete paralysis of the nerve ensued. Of thirteen of the patients in whom the tumor was enucleated three had a temporary complete paralysis with a return of the function of the nerve after periods varying from six weeks to one year; in two patients complete permanent paralysis followed the operation. In three patients temporary partial paralysis occurred,

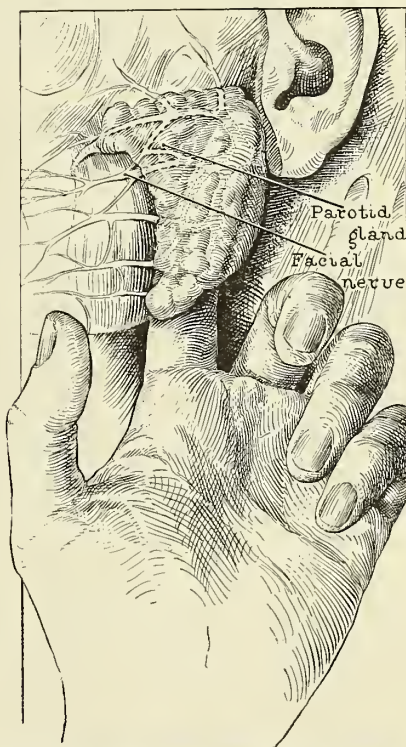


Fig. 5. Method sometimes used in trying to prevent injury to the facial nerve. The facial nerve has been exposed and separated from the anterior portion of the parotid gland. A finger is kept in front of the nerve while the tumor is being removed.

#### DISCUSSION

DR. MOSES BARRON, Minneapolis: Dr. Sistrunk's paper presents some very interesting features some of which should be emphasized. Tumors of

the parotid are a rather peculiar type of neoplasm not to be found in other parts of the body except in the other salivary glands.

The importance of operating early on mixed tumors of the parotid is just as essential as that of operating on cancer in different parts of the body. The earlier the operation the better the results obtained.

Dr. Sistrunk emphasized the fact that these tumors become malignant. In the early stages they are not very malignant. As long as they remain encapsulated they do not metastasize. It has been found that in the early stages when the capsule is still unruptured, the tendency for these tumors is to remain localized, and to behave very much like basal-cell carcinomata. Therefore, any surgical procedure in which the entire tumor is not removed is worse than not attempting surgery at all, since the portion which remains will very shortly spread into the surrounding tissues and into the lymph nodes draining the part. Consequently, in operating on these tumors it is very important that the removal be complete. Tumors with unruptured capsules seldom metastasize, which fact pleads for an early removal.

These tumors occur at all ages; they have been described in infants nine months old, and they occur at the age of 75 years or more. They are most common between the ages of 20 and 40.

Some of the tumors develop rapidly in the course of a few years and become very malignant. Others develop more slowly and persist for a considerable period of time.

The character of this tumor is quite different from tumors in other parts of the body probably because of the glandular secretion. It is a question whether this type of tumor is a true mixed tumor. Although we find structures resembling epithelium, mucoid tissue, connective tissue and cartilage, the origin of these elements is under debate. A number of investigators classified these tumors as endotheliomata arising from the endothelial spaces within the gland, but later researches of men like Krompecher, Eberic and Ewing have demonstrated fairly well that these tumors are epithelial in origin. They arise either from the epithelium of the acini and ducts of the gland or from misplaced embryonal rests and branchial remnants. The origin of the mucous tissue as well as the cartilage has been traced directly to the epithelial cells. Occasionally portions of the tumor present areas of squamous epithelium with prickly cells. The presence of prickly cells in some of the tumors suggests strongly that these tumors arise from epithelium rather than from endothelium.

The epithelial cells often arrange themselves in gland-like structures. These have been traced out and have been found to show an anatomical relationship to the ducts and acini of the gland.

The appearance of cartilage and mucoid tissue in these tumors has led pathologists to classify them among the mixed tumors. But careful studies have shown that it is the epithelial strands themselves

that gradually become transformed into the mucoid and cartilagenous tissue. Such transformation is rather unique and is apparently not found in any other part of the body.

DR. A. R. COLVIN, St. Paul: The interest in parotid tumors outside of the operative technic lies largely in the question of pathology. There are perhaps no other tumors which prove to us how little we really know about tumors. We find a cellular structure, epithelial or endothelial, in the parotid gland, we shell that tumor out like a pea out of a pod and inside of a year or two we find a recurrence. We have as a matter of convenience divided parotid tumors into mixed tumors, enchondroma, lipoma, sarcoma, but histologically we cannot be sure of their behavior. I know as a matter of personal experience that we are never safe with parotid tumors. I know from my own personal experience that recurrences are seen even among the most encapsulated tumors within two or three years. There is no question about the fact that the earlier such tumors are removed the less liable, of course, we are to have recurrences.

DR. H. B. SWEETSER, Minneapolis: I recently had a case of mixed tumor involving the labial glands. The patient presented himself with a tumor of the right upper lip projecting beyond the tip of the nose. He also had two other small tumors on the other side of the upper lip. A diagnosis of fibroma was made, but histologic examination of the larger tumor showed it to consist of epithelial cords, cartilage, bone, fibrous tissue, and, what the pathologist said was a very rare association,—pearls of squamous celled epithelioma. The real diagnosis, therefore, was a mixed tumor of the labial glands. In a recent article on mixed tumors of the parotid gland, the author described a mixed tumor of the labial gland, very similar to mine. It is well, therefore, to remember that mixed tumors are found elsewhere than in the salivary glands, notably in the labial glands. With this fact in mind, one may possibly avoid an unnecessary mutilating operation.

DR. W. E. SISTRUNK, Rochester (closing): I wish to thank the gentlemen who have discussed the paper. I was interested in their remarks regarding the pathology. I did not touch fully upon this because I know that considerable difference of opinion exists among pathologists as to the etiology of these tumors.

I think Doctor Sweetser is correct in believing that these tumors occur in other regions. Doctor New recently reported a series of these tumors which had occurred in other regions. We have felt that when an encapsulated tumor of this type is completely removed the chances for recurrence are extremely small. Most of the patients in whom we have seen recurrences were those in whom the tumor was ruptured during removal. I believe if any portion of the capsule is left, a recurrence is likely to occur.



## POLYCYTHEMIA VERA\*

By

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*St. Paul, Minn.*

A variety of conditions may produce an erythrocytosis or increase in the red blood corpuscles above the normal. When dependent upon a discoverable cause such a red cell increase is grouped under the secondary polycythemia, which may be classified as follows:

(a) Relative increase of red corpuscles due to plasma diminution caused by deficient fluid intake or marked fluid loss, as in the case of severe diarrhea, diaphoresis, diuresis, etc.

(b) A local increase of red blood cells due to asphyxia of the tissues.

(c) Compensatory increase in the red cells due to pathological processes, as in cardiac or renal diseases, respiratory diseases, portal or other venous thromboses, chemical poisons such as acetanilid or phosphorous, and finally, methemoglobinemia.

(d) Physiological increase in the red corpuscles following violent exercise or living in high altitudes.

In addition, however, to those conditions in which the rise in red corpuscles is secondary, we occasionally meet with an excessive and persistent increase of erythrocytes for which there is no discoverable cause. To this small but important group of unexplained erythrocytoses the term polycythemia vera, or erythremia, is applied. It is this primary type to which the French investigator Vaquez first drew our attention in 1892, and which Osler in 1903 established in his well known article as a distinct clinical entity. Osler associated with the polycythemia in this primary group certain other clinical findings which have become classical, namely, a chronic peculiar type of cyanosis, a moderate enlargement of the spleen, weakness, headache, and vertigo.

Polycythemia vera may be defined as a disease in which the mechanism determining a normal red cell count has been damaged, the normal balance between red cell production and destruc-

tion having been overthrown, resulting in an abnormal erythrocytosis with its attending phenomena.

Three types of primary polycythemia are at present recognized:

(a) The type described by Vaquez and Osler showing a normal blood pressure and an enlarged spleen.

(b) A second type with normal blood pressure values but no palpable spleen.

(c) The type described by Gaisbok, lacking a palpable spleen but showing a definite hypertension.

Moderate kidney disturbances, especially the finding of albumen and casts in the urine, may occur in all three types.

## PATHOGENESIS

Concerning the pathogenesis of polycythemia, theories may be divided into several groups the most important of which are:

I. That the disease may be due to a primary irritation of the bone marrow. In favor of this is the evidence of bone marrow activity described in many cases, i. e., the occurrence of nucleated red cells in the blood stream, an absolute increase in the leukocyte count, findings of myelocytes, as well as autopsy findings of hyperplastic bone marrow. Osler, Zeller, Falta, Tancre and Bottner support this view. Pathologically six of the cases collected by Osler showed intense hyperplasia of the bone marrow, "myelomatosis rubra," to employ his phrase. He also found nucleated red cells were present. Falta reports leukocytosis, the findings of myelocytes and myeloblasts with a basophilia of 6 to 8 per cent. Bottner supports this view because of marked therapeutic success obtained by X-ray therapy of the long bones.

II. A theory that the disease may be due primarily to a lack of normal erythrocyte destruction, placing the cause variously in the liver, spleen or in the blood itself (Pribam, Lowy, Herrenheiser). Data to support this view will be discussed in connection with the present case.

III. In addition to the two chief groups just mentioned, it may be added that deficient quality of hemoglobin, disturbed balance of blood and tissue gas exchange, and certain vague vasomotor changes, have also been considered as possible etiological factors.

The following case is presented especially be-

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

cause of its important bearing on the pathogenesis of polycythemia vera:

*Male*, age 54.

*Family history*: Negative.

*tal and optie*. Frequent attacks of vertigo.

*Family history*: Negative.

*Occupational history*: Pattern maker.

*Past history*: Pertussis. Chronic pharyngitis. Slight deafness.

*Cardio-Respiratory*: Negative.

*Gastro-Intestinal*: Appetite good. For the last four years has had occasional distress immediately or one-half hour after meals. Bowels regular.

*Genito-Urinary*: Negative.

*Neuro-Muscular*: Negative.

*Marital*: Married 27 years. 3 children. Denies venereal infection.

*Habits*: Negative.

*Weight*: Present, 150; no recent loss.

*Present illness*: In May, 1913, both the patient and his family noticed that the color of his face had changed from a normal tint to a cherry red. The patient thinks that this change of color took place in a relatively short time. In the following month he had a sudden severe attack of vertigo and had to be assisted into bed. While in bed he vomited and this was followed by a terrific headache, chiefly frontal and optic. It felt to the patient as if knives were cutting into his eyes and at the same time the sense of pressure was so great that he felt as if his eyes might burst from their sockets. A doctor was called who prescribed some capsules with temporary relief.

From this time on the headaches came with increasing frequency and violence until finally the patient dreaded going to bed at night because of them. They were usually optic and hemispherical, the right side being chiefly involved. Lying down made the pain insupportable. Drinking black coffee and standing erect were the only measures that gave any relief. During this period the purplish-red color of the hands and face became extreme.

The patient consulted us in January, 1920, complaining of almost incessant, violent headache and frequent attacks of vertigo. He stated that the bluish-red cyanosis then present was made worse by exercise and hot weather.

*Physical Examination*: January 17, 1920. A

well nourished individual presenting a most striking bluish-red cyanosis of face, ears, hands, and to some extent, feet.

*Eyes*: Pupils react slowly but fully to light and accommodation. Conjunctivae are suffused.

*Ophthalmoscopic examination*: Fundi deep red, marked filling of veins, discs normal.

*Mouth, tongue and pharynx* show an extreme purplish-red color.

*Heart and lungs*: Negative.

*Blood pressure*: Systolic 144, diastolic 86.

*Abdomen*: Spleen just palpable at costal margin.

*Extremities*: Negative except for bluish-red color.

*Deep reflexes*: Hyperactive but equal.

*Fluoroscopic examination of heart and chest* negative.

#### LABORATORY FINDINGS

##### Blood Examinations

| Date                           | Red Cells | Leucocytes | Hemoglobin  |
|--------------------------------|-----------|------------|-------------|
| 1-17-20                        | 7,840,000 | 6,800      | 115% (Dare) |
| 1-29-20 (a) before exercise    | 9,480,000 | .....      | .....       |
| (b) after exercise             | 9,696,000 | .....      | .....       |
| 2-2-20 550 c.c. blood removed  |           |            |             |
| 6 hours after venepuncture:    |           |            |             |
| (a) before exercise            | 7,040,000 | .....      | .....       |
| (b) after exercise             | 7,496,000 | .....      | .....       |
| 2-21-20                        | 7,536,000 | .....      | 115%        |
| 3-16-20                        | 7,736,000 | .....      | 105%        |
| 3-29-20                        | 6,888,000 | 7,000      | 108%        |
| 4-12-20                        | .....     | 11,000     | .....       |
| 4-5-20 250 c.c. blood removed  |           |            |             |
| 4-19-20                        | 7,144,000 | .....      | .....       |
| 4-30-20                        | .....     | .....      | 107%        |
| 5-24-20 200 c.c. blood removed |           |            |             |
|                                | 6,782,000 | .....      | 102%        |
| 6-15-20 250 c.c. blood removed |           |            |             |
| 7-17-20 200 c.c. blood removed |           |            |             |
| 7-29-20 150 c.c. blood removed |           |            |             |
| 8-21-20                        | 6,784,000 | 12,800     | 96%         |

Smears: Red cells normal throughout; no nucleated red cells. Howell-Jolly bodies or myelocytes.

Differential of leucocytes: P.M.N. 63%, Lym. 28%, Trans. 4%, Mono 2%, Eos. 1%, Bas. 1%.

##### Coagulation time:

3-29-20..... 3 min. (normal 3-5 min.)

4-12-20..... 4½ min.

4-19-20..... 5½ min.

4-30-20..... 4½ min.

##### Bleeding time:

2 min. (normal 2-5 min.)

##### Blood Chemistry

Total Solids: 24.7% (normal 20%).

Urea nitrogen: 15.45 mg. per 100 c.c. (normal 12-15 mg.)

Creatinin: 2.85 mg. per 100 c.c. (normal 1-2.5 mg.)

Blood sugar: 0.10% (normal 0.08-0.12%).

Total nitrogen of blood: 1800 mg. per 100 c.c. (normal 3000 mg.)

Non protein nitrogen: 34.8 mg. per 100 c.c. (normal 25-30 mg.)

Sodium chloride: 0.57% (normal 0.65%).

Cholesterol of blood: 0.312% (normal 0.15%).

Cholesterol of serum: 0.268% (normal 0.15%).

*Urine*: Shows a trace of albumen, an occasional hyaline and granular cast, a few red cells and leukocytes.

*Phenolsulphonethalein*: Excretion normal.

#### SUBSEQUENT COURSE

During February and March the patient was kept quiet, for the most part in bed. Following the removal of 550 c. c. of blood by vene-



puncture on February 2nd there was a marked subjective improvement. The patient stated that before withdrawal of the blood he had dreaded lying down because of the intensity of the headache, but that a few hours after the venepuncture he felt completely relieved not only from the headache but also from the sensation of fullness in the head and the vertigo. A distinct effect on the red cell count was noted after this venepuncture, the cells dropping (as shown under "Laboratory findings") from 9,480,000 before venepuncture to 7,040,000 six hours after the venepuncture.

Up to date, that is, during a period of eight months, the marked subjective improvement has continued. A number of venepunctures have been performed during this time. The patient has been able to fully carry on his work now for several months without any return of the headaches or of the vertigo.

#### DISCUSSION

This case fits best into type B of the primary polycythemia, the spleen when the patient was first seen being only just palpable and later not discernible to touch. The cyanosis and subjective symptoms are of course typical, while the red count and hemoglobin values are of average height for cases of erythremia. The highest values as yet reported are those given by Tancre whose red count reached 14,200,000, with a hemoglobin (Sähli) of 178 per cent and a white cell count of 18,000. A point of interest is Tancre's findings of abundant normoblasts. In the present case there is no absolute increase of leukocytes, nor is there evidence of erythropoietic activity, facts in accord with the observations of Herrenheiser, Fraser, Pribam and others.

Tancre reports a lengthened bleeding time with a coagulation time in the upper limits of normal. Our results are within the normal limits for both.

Total solids of the blood in our case are above normal, the percentage being somewhat higher than that reported by Herrenheiser. Total nitrogen is low. Von Jaksch and Lowy report an increased nitrogen content of the whole blood with a low nitrogen content of the red cells, the latter finding, according to these investigators, indicating old undestroyed red cells "physiologically under par."

In the present case exceptionally interesting

values were obtained for blood and serum cholesterol, both being increased in amount to almost twice the normal. Rothchild and Falsen believe the liver to be the regulator of cholesterol-metabolism, the cholesterol being kept at a more or less constant level by its excretion through the bile. The action of cholesterol is strongly anti-hemolytic, and significantly Gorham and Myers report low cholesterol values in the blood plasma of patients having pernicious anemia. Pribam, who also found high values for serum cholesterol, believes that in erythremia the destruction of red corpuscles in the spleen is interfered with because of the increased serum cholesterol. He showed such serum to possess greater resistance to hemolytic poisons than normal serum.

Lowy corroborates Pribam's findings. He believes that splenectomy in erythremia either makes the condition worse or does not affect it, and he assigns a secondary role to the spleen as a possible causative agent. His conclusion is that increased serum cholesterol prevents red corpuscle destruction and that the piling up of old red cells in the blood stream finally acts as a stimulus to the blood-forming marrow with a consequent appearance in the blood of immature red cells. These results, together with the findings in pernicious anemia, when compared with the figures obtained in the present case both as to blood and serum cholesterol, point strongly toward insufficient red corpuscle destruction as a causative agent of at least one type of polycythemia of which the present case is a striking example.

Considering all available data, therefore, it seems quite possible that polycythemia vera may be produced by two distinctly opposite processes:

I. By pathological activity of the erythropoietic system with abnormal production of red cells due to a stimulus of unknown origin and doubtful point of attack.

II. By lack of normal red cell destruction, which in a certain number of cases, of which the present is an example, may be induced by an abnormally high serum cholesterol content, the latter perhaps indicating a functional disturbance of the liver.

Therapeutically the above division is likewise justified. In the present case venepuncture was resorted to with excellent results. The severe headache, dizziness, subjective sensations of ting-

ling, numbness, etc., which the patient complained of when first seen, disappeared almost entirely after the first removal of 500 c. c. of blood. Altogether nine venepunctures were performed, the last eight chiefly in the hope of influencing the red count since the subjective symptoms had not reappeared. After the first venepuncture it will be seen that the red cell count dropped by two million while the hemoglobin fell from 115 per cent to 96 per cent. Cases in which there is definite evidence of bone marrow activity are often not relieved or, as in Tancre's case, are even made worse by venesection.

#### TREATMENT

The treatment of polycythemia in general is symptomatic at best, the measures employed being as follows:

(a) Venesection. Giving in the present case excellent results.

(b) X-ray. Bottner sums this up well by saying: 1. That the spleen should receive stimulating doses of rays to promote erythrolysis; 2. That the long bones should receive big doses of rays to paralyze erythropoietic production.

X-ray treatment of the spleen alone has yielded disappointing results, that of the long bones, on the other hand, good ones.

(c) Radium. Falta reports very favorably on the use of radium particularly when applied over the spleen and ribs.

(d) Drugs. In a recent communication Eppinger and Kloss lay great stress on the use of phenylhydrazin and toluylendiamin. They gave phenylhydrazin in doses of 2 to 10 c. c. of a 1 to 5 per cent solution subcutaneously with great improvement subjectively and a marked drop (to normal) of the red count. These two drugs aid in the destruction of red cells. Benzol, on the other hand, checks production.

#### CONCLUSIONS

1. A strict differentiation between the primary and secondary polycythemias is of great importance.

2. In cases exhibiting severe headaches or vertigo, polycythemia as a possible cause should be more frequently considered.

3. In the present case of polycythemia vera we are dealing with diminished red cell destruc-

tion which is apparently dependent upon an increased cholesterol content of the blood serum.

4. The importance of determining bone marrow activity on the one hand, or diminished erythrocyte destruction on the other, is essential in every case of polycythemia as a practical basis for therapy.

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#### DISCUSSION

DR. H. Z. GIFFIN, Rochester, Minn.: Dr. Richards' observations concerning the cholesterol content of the blood are important, and his contrast between pernicious anemia and primary polycythemia is very interesting. In that connection I might say that I have



used polycythemics twice in transfusing patients with pernicious anemia and no harm has resulted, nor was there especial benefit. This paper is of importance to all of us because of the fact that cases of polycythemia frequently are not recognized. Many mild cases of polycythemia have been diagnosed as neurasthenia on account of their nervous symptoms, and some typical cases have not been recognized at all. A few have been diagnosed brain tumor on account of headache and the fact that they had developed choked disc. Patients with polycythemia are apt to have cerebral hemorrhage. The importance of the nervous symptoms, the importance of the recognition of the type of erythrosis (the color is not due to a true cyanosis), and the importance of the eye signs are definitely established.

Venesection repeated at intervals gives symptomatic relief and this is all one can hope for at present in the treatment of the condition. Splenectomy has not been done in any of our cases. Four instances have been reported in the literature, but the results are not conclusive either for or against splenectomy.

DR. H. L. ULRICH, Minneapolis: In the discussion of this disease the most fundamental point is that we have an increase in the reds; the enlarged spleen, the increased blood pressure, the absence of splenomegaly, or again the absence of blood pressure and no splenic enlargement are but variants around this central fact. When one considers the findings with the increased density of the body fluids a good many of the symptoms could be explained on the basis of a true plethora expressing itself in this or that organ. For instance the eye symptoms, papilledema going on to choked disc, or again the severe headaches are most likely due to pressure i. e. plethora. In going over the literature the variety of group symptoms are rather confusing. We have cases where vasomotor disturbances go with severe hemorrhages, or thrombosis; and as Dr. Giffin mentioned there are cases in which there is a definite endocrine complex. It is this variety of symptom complex which makes the classification very confusing and for this reason it is well to consider a fundamental increase of the reds without any explainable cause, such as disease of the lungs, or from chemicals, a form of polycythemia vera. The liver and bone marrow have been mentioned in the etiology of this disease. The spleen also has come in for its share as a causative agent. The spleen is supposed to send out a hemolytic substance which stimulates the bone marrow to overproduction. This theory is based on the same principle as that of overproduction of antibodies following the stimulation of a toxin. In this connection we must not forget the recent contribution of Lamson, who has been able to produce temporary polycythemia in animals and man by the injection of adrenalin. Then there is another point; we have an increase in volume of carbon dioxide and oxygen content of the blood. This volume increase may have some effect on endocrine secretion. This is however mere speculation. Dr. Richards' idea that the increased

cholesterol content of the blood due to impaired liver function may inhibit red cell destruction is a novel and a distinct contribution to the etiology.

In the matter of treatment some have adopted splenectomy, some have used radiation of bones, and some have used bleeding. These points have been dwelled upon by Dr. Richards. I think if we determine the type based on symptoms and the possible etiological factor, it will determine our approach to treatment.

DR. L. G. ROWNTREE, Rochester: I am greatly interested in this paper, and particularly in Dr. Ulrich's remarks in relation to Lamson's work on polycythemia. This work was begun in our laboratory at Johns Hopkins. Dr. Lamson attempted to mark the red cells in such a way that he could identify them again after injecting them into other individuals in an attempt to determine blood volume. Simultaneously we tried out other lines of determining blood volume. The blood volume should be remembered in considering polycythemia. We have two factors, the cells and the plasma. We usually think of polycythemia as being due to increased blood cells, without distinguishing whether or not this is relative or absolute. In the blood counts we have to consider the blood plasma as well as the cells. In our blood volume method we determine first the plasma in the body, and from the relation of plasma and cells as shown by the haematocrit we arrive at the total volume. By determining blood volume it is impossible to differentiate in a given case whether the polycythemia is due to a decrease in the plasma body resulting in a relative increase in the blood cells, or whether it is an absolute and relative increase of the red blood cells. This is a fundamental conception and should be taken into consideration in any theory which has to do with the etiology of polycythemias. I might say that polycythemias of both types have been described.

Dr. Schneider's duodenal content methods might be used to great advantage in determining whether red cells undergo less destruction in polycythemia.

I should like to speak of a case of polycythemia I saw last week with Dr. Giffin. The patient two years ago showed a marked polycythemia. He now returns with a normal blood picture, but he has developed true gout, with tophi formation. For the gout we are using radium, with remarkable results. Dr. Richards mentioned radium as a treatment for polycythemia. We should differentiate the way it is used. Radiation over the spleen might decrease the red cell count, but if we use radium as a sipping cure, as it is usually used in gout, an increase in the red blood count will probably follow.

DR. RUSSELL M. WILDER, Rochester: I should like to ask Dr. Richards whether in the course of his studies he has observed an increase in the sugar content in any of his cases. I know in this particular case none was found, but in this connection it may be interesting to mention a case at the Mayo Clinic which will be reported in more detail, a case of poly-

cythemia vera and true diabetes mellitus occurring simultaneously. This is the first instance to my knowledge, after looking through the literature fairly carefully, of the association of these two diseases. Leukemia has been noted in diabetes, but not polycythemia vera.

DR. GEORGE DOUGLAS HEAD, Minneapolis: A case that I have now under observation is that of a physician's wife who apparently has true polycythemia, in which the red count is about eight million and the haemoglobin about one hundred and twenty-five per cent. In this case, the most careful examination which we could make disclosed no etiological factor except that the patient gave all the tests for tuberculosis, including the subcutaneous test. It is a point to bear in mind that primary tuberculosis of the spleen may simulate very closely polycythemia and give a typical picture of this disease. This patient was given radium over a period of a month, the spleen being exposed in various parts, with marked diminution in the number of red cells and haemoglobin. After observing the patient for a year's time and noting the remarkable improvement with the use of radium, I was inclined to report this case as a cure of a case of polycythemia by the use of radium. However, the rules of conservative observation led me to wait a while longer, and last winter the patient returned with the red count at about the same figure as when I had first seen her. It is quite possible that with polycythemia we have a disease which runs exacerbations and remissions, much as does pernicious anaemia. The careful chemical studies which Dr. Richards has made upon the blood in connection with his interesting case is a splendid object lesson to each one of us and clearly indicates that not all of the resources of investigation have been exhausted by any means in the study of these obscure blood conditions.

DR. ERNEST T. F. RICHARDS, St. Paul (closing the discussion): I appreciate very much the interesting discussion this paper has elicited. The case is reported not because of its clinical interest, as the subject has been well covered clinically in previous articles, but because we especially wish to bring out the important bearing of the serum cholesterol content on red cell determinations and the inhibiting effect of a raised serum cholesterol upon the amount of erythrocyte destruction. We feel this case especially emphasizes this important phase in the pathogenesis of polycythemia.

## USES AND ADVANTAGES OF ELECTRICALLY DRIVEN BONE SURGERY EQUIPMENT IN HEAD SURGERY, WITH PARTICULAR REFERENCE TO EAR, NOSE AND THROAT OPERATIONS\*

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That more oto-laryngologists of this section may avail themselves, and give their patients the benefit, of the electrically driven instruments, which will be briefly described and their uses given, it seems opportune to discuss this subject today.

The advantages of this method over other methods, as, chisels, gouges, curets and punches, are so great and varied that it seems surprising to the author that any head surgeon should today be without such equipment.

One of the greatest advantages of such technique is the amount of time saved, allowing the operator to do operations which are confined mostly to bone with the saving of time, varying from twenty to sixty per cent, depending upon the type of operation done. This allows for a shorter anesthetic, the advantages of which you are all well aware. The use of the burr has a hemostatic action, so that the operator does not have to wait for sponging. This also saves time. The dexterity with which one is enabled to work about in dangerous areas, especially in the mastoid operation, is a great time saver. But the greatest factor in time saving is the rapidity with which bone may be taken down with the newer instruments. The most important advantage of all is the greater protection and safety for the patient. It has been repeatedly demonstrated that bone may be taken down completely and rapidly against the dura, lateral sinuses, seventh nerves, jugular bulb, or like important structures, and that soft tissue, if at all movable, will be actually pushed aside by the burr without injury. A simple test, that will inspire confidence in the new operator, is to pass the rotating burr over the extended gloved hand and note the rubber glove is uninjured. The bony walls of the cochlea and semi-circular canals may be actually taken down or removed,

\*Read before the Minnesota State Medical Association, October, 1920, St. Paul, Minn.





without entering the lumen of these structures, as has been demonstrated on the cadaver, as well as the entire dissection of the seventh nerve, without injury to its sheath.<sup>1</sup>

A most important factor is the elimination of surgical shock—this partly by reduced operating time, partly by reduced hemorrhage and largely by elimination of the continued hammering blows and their effect upon the central nervous system in removing bone with chisels and gouges. In doing skull trephine for decompression, or other cranial operations, time and shock may be saved the patient, and much labor the operator, by using the skull trephine and guard attachment, followed by the spiral osteotome.

There are really no disadvantages or objections, if a good equipment is used. Much has been said about burning the bone from the heat of the burr. The burr does not become hot if a number are used and rapidly changed. This change is of a distinct advantage, as the surgical nurse can keep the grooves thus readily cleaned. Beck has answered this objection in detail from his studies in the laboratory of the North Chicago Hospital. At different stages of mastoid operations, specimens were taken for microscopic study, and he reports that such objection is based on myth.

As to the use of equipment, there are many engines and attachments being offered to the profession by the instrument makers, and many of these, no doubt, will prove very satisfactory instruments. Some of these types are best suited for some particular operation. The one used by the author, and found most advantageous for all types of work, is the Halle-Mueller universal bone surgery equipment. This equipment is particularly adapted to clinics and hospitals and can be used with equal benefit by the general surgeon, the orthopedist, and the oto-laryngologist. The original was designed by Dr. Max Halle of Berlin and has a handpiece that is far superior to other models. The chief factor of the handpiece lies in the fact that the instrument is in operation only while the index, or trigger, finger is held back. It has a natural hold, or pistol-grip, and there are no projections from above to interrupt the vis-

ion. This is particularly desirable when working with the use of the head-mirror and reflected light. All attachments may be boiled without injury, with the other instruments.

A perusal of the literature finds the origin of the use of such equipment in doubt, but that it was first adopted from the trades by the general surgeon for reducing rough edges of bone is apparent. It was adopted secondly by the dental surgeon and thirdly by the oto-laryngologist. Credit is given to Jansen for first using the electrically driven burr in mastoid surgery and to Allport for taking it up first in this country and extending its use to other operations about the head. Members of this section, who are doing general or orthopedic surgery, may be referred to the articles of Albee,<sup>2</sup> Magnuson, Hartley, Kenyon, Creyer and Davidson. Oto-laryngologists, who most enthusiastically advocate electro-motor instrumentation, are Halle, Jansen, Boettcher, Allport, Beck, Robinson and many other well known men. In the literature produced by this group are detailed twenty-three operations, as practised by them, in which they claim great superiority for this technic. To attempt to go into all these operations would take entirely too much time for the brevity of this paper. We will therefore touch upon some of the vital points of two or three, especially adaptable to electro-motor instrumentation on account of the bony structures in which the operations are performed. The same principles may be applied to all.

One of the most satisfactory operations to perform is the radical antrum, or modified Caldwell-Lue, operation. As performed by the author, ether anesthesia is used, transferring to the use of the Beck-Muelle ether vapor apparatus. Incision is made at the gingio-labial margin, immediately over the base of the infected antrum, a periosteal elevator quickly exposing the bone. A No. C round burr opens the antrum directly from in front and several rotations of the rapidly moving burr will take off the necessary amount of wall to work through. The mucous membrane is then incized and the cavity sponged and such diseased tissue as found quickly removed with the curet,

<sup>1</sup>Beck, Joseph C. A plea for the electrically driven burr in bone surgery of the head. *Trans. American Academy of Ophthalmology and Oto-Laryngology*, 1914.

<sup>2</sup>Albee, Fred H. *Bone Graft Surgery*, W. B. Saunders Co., 1915. *Orthopedic and Reconstruction Surgery*, W. B. Saunders Co., 1919.

being careful to remove no mucosa which is not diseased beyond prompt regeneration. The mucous membrane, including periosteum, is removed from that portion of the nasal wall lying beneath the attachment of the inferior turbinate body. One essayist,<sup>3</sup> at the last meeting of our American Academy, has advocated the burr to this point and then abandoned it as it became the most useful. The round burr is now again brought into use, working from behind forward, removing the bone down to the level of the floor of the naris. A peculiar action of the burr is that the bone is removed, leaving the mucous membrane on the nasal side intact; thus bleeding is reduced to a minimum and the nose does not have to be packed while operating. Incision is now made with a small knife and the flap thus formed laid upon the floor of the maxillary antrum. The gauze pack is inserted through the nose and removed carefully the following morning. The entire time of the operation takes scarcely more than twenty minutes. There is no shock, practically no facial swelling, and the operation cures completely, no matter how chronically diseased the antrum may have been. A perfect drainage is secured and, after the third day, if it is found necessary, the patient may be given a syringe and taught how to cleanse the cavity.

It may be remarked, in passing that the Halle<sup>4</sup> frontal sinus operation is particularly adaptable to certain types; that the Kronlein operation is greatly hastened with electric equipment; and that the small burr takes out the button of bone with greatest facility in the intra-nasal dacryocystotomy or West operation. On account of the thin, fragile bone encountered, there is no indication for the burr in exenteration of the ethmoid sinuses. On the contrary, recent experience has demonstrated the technic of J. A. Pratt,<sup>5</sup> as published last year, to be the operation par excellence.

The operation in which a far greater number of otologists are using the burr, is, of course, the mastoid operation. This operation is particularly adaptable on account of the dense bone necessary to be removed. Inasmuch as the radi-

cal operation is practically a continuation of the simple, we will discuss the radical only.

Briefly, the technic is as follows: Under ether anesthesia, an incision is made with one sweep of the knife through the periosteum, exposing the bone. Hemorrhage is controlled by pressure through sponges held by the assistant, while the periosteum is rapidly elevated with an Andrews periosteotome. No haemostats are used, but hemostasis is at once accomplished by the immediate use of Jansen's retractors—an incidental saving of ten minutes operating time. The No. C burr is placed over the suprameatal triangle and a few seconds of application usually suffices to expose the mastoid antrum. Burrs F and G now remove the cortex. The small round burrs are found most useful in thoroughly exploring the accessory cells and completely exenterating the mastoid process. Stacke's director is placed in position and the small burr A used in removing the bridge. The elongated round burr, No. 1 or 2, is now brought into use and the annulus tympanicus removed, giving special attention to the hypo tympanium. This can be done safely and quickly with the burrs and allows for easy and thorough after-treatment. Lack of thorough work at this point of the operation with the older instruments is, no doubt, one of the main reasons why so many cases were not completely cured. Another most important reason was the incomplete exenteration about dangerous areas. The eustachian tube is taken care of by the Robinson burr. A distinct advantage of this method of operating is the absolutely smooth cavity obtained, thus allowing healing to extend rapidly. No skin grafting is necessary. A thorough irrigation with 1 to 1,000 bichloride solution is used to remove bone dust and debris.

To those who have not been obtaining the good results expected, or, as one member of this society has recently put it, have been "becoming soured on the radical," this method of operating is recommended.

#### DISCUSSION

DR. J. A. PRATT, Minneapolis: I want to thoroughly endorse this paper and I do so by an experience of 14 years in the use of the electric burr in head surgery. My work was taken under Dr. Frank Allport, who was the first one in the United States to use the electric burr. He was using it at a time when most doctors were laughing at the idea of using

<sup>3</sup>Lemere, H. B. The Diagnosis and Treatment of Latent Antrum Disease. Trans. American Academy of Ophthalmology and Oto-Laryngology, 1919.

<sup>4</sup>Halle, Max. Frontal Sinus Operation. Archiv fur Laryngologie und Rhinologie Band 29, Heft 1.

<sup>5</sup>Pratt, J. A. An Ethmoid Operation. Trans. American Academy of Ophthalmology and Oto-Laryngology, 1919.



an electric burr. The instrument I use is the old Victor model and while it is just a matter of what we are used to, I think it has the best handle for the purpose. It has a straight handle and I use it just as I would a pen which gives absolute control. You can make it cut very lightly or by using both hands, make it cut very rapidly. You can burr most anywhere with it and work very rapidly, doing it with as little shock as burring a tooth.

When I speak about a simple mastoidectomy and letting the patient go home the next day, it is a simple mastoiditis with out complications. You are not in any place where you should have shock. In doing simple mastoidectomies with the electric burr, there is no shock, so that the patient can easily go home just the same as you would let a tonsil case go home. If we use ether we use very little, and generally we use gas in our operations. A man was talking to me today who had tried to do the operation after reading the articles, using a dental engine and burr. This is not suitable as it lacks power and the burrs are too small. It is best to see a man do the operation. I think at least every clinic week during the past three years we have had one case which shows how the burr can be used. You can take the covering off the sinus, you can open on to the dura and the shock is practically nil. We have two or three cases operated on in the morning, who went home at night—no more shock than you would have with a simple tonsillectomy.

Of course, there have been a great many things written on the kind of electric bone engines and it seems to me that the one you are familiar with gives the most satisfaction. They are not expensive, one case will pay for it. When once used you will wonder why you did not use it before. A simple mastoidectomy very seldom runs over twenty minutes, and the lessened work, the ease and freedom of using it, and the freedom from any particular danger or shock is really remarkable.

DR. H. I. LILLIE, Rochester: My personal experience with mechanically driven instruments is very limited, but in visiting clinics where these mechanical burrs are used, I have seen some very beautiful work. The use of the burr in the hands of very experienced men in doing the radical operation is not without danger. The operation is not 100 per cent, in that it is frequently necessary to operate on the mastoid where you have not access to electricity. I prefer to use instruments which I can use at any time and in any place. I have no personal objection, but I think I would not attempt their use in preference to the usual instruments.

DR. L. W. MORSMAN, Hibbing (closing): There is little to add. I did not go into the operations very much in detail on account of lack of time. I want to cite a case of a little boy on whom I operated recently. I found an atypical sclerotic mastoid in which the seventh nerve came over and down into a split pea-sized antrum, covered only by a thin shell of bone. As the antrum was opened, the burr passed

directly against the seventh nerve, uncovering it to the extent of five or six m.m. I would hate to think what would have happened to that nerve had I been operating with hammer and chisel. As it was, there was not even a traumatic paralysis and, when I went to see the little boy the next morning, he was sitting up with that "two-sided grin" that we always like to see in these cases.

I have never injured a lateral sinus with this equipment, and I have never seen one, or any other vital structure, injured with the burr. As to one hundred per cent operations, I think it is the general consensus of opinion that medicine and surgery has not been developed to that point of perfection.

As a former assistant to Dr. Joseph Beck, I very naturally fell into the use of using this equipment in head surgery. The technic, however, is simple and needs no special preparation. A great many men think that, because a quarter horse power, high speed motor, is used with resulting high speed of instruments, the equipment is dangerous. As a matter of fact, the opposite is true, as witness: the professional wood carver with a similar equipment, working out designs of minute detail. I might suggest to the new beginner that he have his old instruments laid on the side table. This I still do, as I am not sure of the electrical current in our locality, although it has not happened to fail me yet. I would no more think of doing, for instance a mastoid, without the aid of electrically driven equipment than I would consider doing a tonsillectomy under general anesthestia without the aid of an electrically driven ether vapor suction apparatus.

## ACUTE LYMPHATIC LEUKEMIA\*

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Acute lymphatic leukemia, like many other diseases, presents itself in a variety of clinical symptoms difficult of interpretation without a study of the blood. Being a comparatively rare disease, the clinician frequently overlooks it because he fails to remember its important clinical features. Many a case of acute lymphatic leukemia has run its course and passed into the death records diagnosed as purpura hemorrhagica, scorbutus, purpura rheumatica, Werlhof's disease, typhoid fever, acute septicemia, diphtheria, or purpura simplex. If all the cases presented a well defined leucocytosis, the diagnostic problem would be much easier. Such is, however, not the case.

Studied from the standpoint of the blood, we

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have two rather distinct types of the disease. One form exhibits a high leucocytosis, reaching even a figure as high as 550,000. In this type, the small mononuclears predominate. The other form shows a varied leucocyte count, depending often upon the stage of the disease when the patient first comes under observation. Some of these cases show a normal or a decreased leucocyte count in their early stages and a moderate or high leucocytosis before death. (Case VII). Other cases exhibit an early leucocytosis and a leucopenia before exitus (Case VI) while in the third group the count remains normal, or below normal, from the beginning up until termination (Case II). The last type to which I have referred is, however, rare. I have seen one such case (Case II) to which I shall refer later, which ran a leucocyte count between 5000 and 6000 throughout the whole course. This latter group of cases differs from the type with the high grade leucocytosis in the high percentage of large mononuclear cells.

The first of the two types (the high leucocytosis group) to which I have referred has long been recognized and, with the enlarged lymph glands, swollen spleen, well marked leucocytosis and the increase in mononuclears to 85 per cent or more, offers little difficulty in recognition. The other form, described under a variety of terms, such as acute pseudo leukemia, aplastic leukemia, alymphatic leukemia, aplastic anemia, etc., is not so clearly described by writers upon blood diseases, and the profession has been left in a confused state of mind relative to the distinctive features of this form of the disease. Of the two forms, to which I have called your attention, the latter is the more rapid in its onset and runs a course much like acute septicemia, with continued rather high fever, marked weakness, hemorrhages into the mucous membrane of the gums, stomach, bowels, and skin, a moderate degree of enlargement of the lymph glands and the spleen, a severe, rapidly developing anemia, and death, sometimes within a few days, but more often three to eight weeks. The enlarged lymph glands rarely become of sufficient size to arrest one's attention and must be felt for, to be detected. It is a mistake for a clinician to wait for the appearance of enlarged lymph glands, visible to the eye, before considering lymphatic leukemia. Any acute infection with hemor-

rhages into the skin and mucous membranes, with or without enlarged glands, calls for its consideration and exclusion.

The first case of this kind which I can remember having seen was twenty-three years ago. The patient was a boy (Case I) about nine years of age. His continued fever of ten days standing and the enlarged spleen, persistent nosebleeds, with ill defined skin manifestations, suggested typhoid fever, and this was the early diagnosis. When the breath became foul and the gums bleeding, gangrenous and sloughing, diphtheria, scorbutus, and cancrum oris were all considered, only to be ruled out. The boy died after an illness of three weeks and the autopsy showed no typhoid, diphtheria, scurvy, or malignant disease. At the time I could not classify the disease and, in the absence of blood findings, was not able to establish a diagnosis. In the light of my later experiences, I now unhesitatingly place the case in this group of acute lymphatic leukemia, of which I am now speaking.

In some of these cases with the low leucocyte count the diagnosis of typhoid fever is not infrequently made, the persistent temperature, bleeding at the nose, and enlarged spleen making a suggestive clinical picture. Some years ago I saw such a case with the late Dr. C. J. Ringnell (Case II). The patient was a young man, twenty-one years of age, with continued high fever of three weeks standing, with nose bleeds, enlarged spleen, and rapidly developing anemia. The diagnosis of typhoid fever seemed justified, with these exceptions,—the Widal reaction was negative and his differential leucocyte count showed 93 per cent of mononuclears, the large mononuclears predominating. This boy lived five weeks after the onset of his sickness, which was fairly acute. The enlarged lymph glands in this case were first noted above the clavicle at the end of the fourth week, and rapidly appeared in the groins, axillae, and neck. They were never large enough to attract one's attention. The autopsy revealed no lesions of typhoid fever. The postperitoneal lymph gland were of hen's egg size. The lymph glands of the axillae, groins and supraclavicular regions were enlarged, as were also those of the mesentery. The diagnosis of the pathologist confirmed the clinical interpretation of the case as that of acute lymphatic leukemia. This young man



gave a history of a severe septicemia, following an infection of his toe, one year prior to the onset of his fatal illness. From this, however, he had entirely recovered. In going over the histories of my own cases and those reported by other clinicians, I have been struck with the number in which some kind of an acute infection has preceded or occurred at the outset of the illness. For example, in Case XII, a carbuncle developed upon the back of the neck one month prior to the onset of his leukemia. Case I complained of toothache a few days before the gums began to bleed and his fever came on. In Case VI, the patient gave a history of having had a purulent discharge from the nose, of several weeks duration, about a year before he came down with his prostration and bleeding gums, and this nasal discharge had recurred with the onset of his leukemia. Case X began with acute tonsillitis and Case VII had had an ulcerated tooth removed before the onset of his sickness. This observation raises the interesting question as to whether or no some very virulent infective organism may not act upon the bone marrow to produce the overproduction of mononuclears, just as in a streptococcus and staphylococcus infection the bone marrow is stimulated to produce an increase of polymorphonuclear neutrophils. However, blood cultures are negative. In Case II cultures before death and from the heart's blood sixteen hours after death produced no pathological organisms. Blood cultures have been made during life in Case III, Case IV and Case IX with negative results. In Case IV, however, the blood cultures after death showed a streptococcus pyogenes in heart's blood and in hemorrhagic lesions of the skin of the leg. The heart's blood also gave a gram positive coccus and two varieties of a gram positive bacillus.

In some of these very acute cases, the clinical diagnosis of purpura hemorrhagica, or pupura simplex, or, if pains are present in the limbs or about the joints, pupura rheumatica, may be made. In a boy of twelve years (Case III) which I saw with Dr. Annis, the purpura upon the legs led to the diagnosis of purpura simplex, and later, when vomiting of blood occurred and the stools became black and tarry, the diagnosis of pupura hemorrhagica was made. A well marked leucocytosis of 90,000, with a mononuclear count of 98 per cent established the correct

diagnosis of acute lymphatic leukemia. This boy survived six days. He had no fever. A great subcutaneous hemorrhage, the size of the palm of the hand, appeared upon the left thigh.

In babies and very young children, these hemorrhagic manifestations in the skin, with or without fever, may present a clinical syndrome very difficult to differentiate from scurvy, without a blood examination. Such a case came under my observation about fifteen years ago (Case VIII). The patient was a child, six months of age, and had been sick seven weeks. There were numerous petechiae on the forehead and lips and under surface of the tongue. In the abdominal wall, just above the anterior-superior spine, was a black and blue hemorrhagic spot, one inch in diameter. The lymphatic glands of the axillae, groins, and neck were not palpable at first, but enlarged before death. The leucocyte count was 18,000, of which 90 per cent were nonnuclears. Before death the child vomitted blood. The autopsy confirmed the diagnosis of acute lymphatic leukemia, but one feature of the bone marrow study deserves special mention, namely, the large number of eosinophiles. I had never seen such a crowding of the bone marrow with these cells before. It seemed to me that every third cell was an eosinophile. No similar case, so far as I know, has been reported.

There is no characteristic clinical picture in these acute cases with slight or no leucocytosis. The enlarged lymph glands may be suggestive but are often late in appearing and must be searched for by the clinician. Every case of purpura of any type, or persistent bleeding from the mucous membranes of the nose, gums, stomach, or bowels, associated with fever, and anemia, calls for a careful examination of the blood to exclude or establish the diagnosis of acute lymphatic leukemia. It is the blood examination, with the presence of the high percentage of large mononuclears, way beyond the proportion seen in any other disease of which I have knowledge, which must be relied upon to establish the diagnosis beyond question.

A striking clinical feature in some of the cases is the ulcerative and necrotic lesions observed on the gums, sides of the cheeks, tonsils and pharynx. When the lesion first appears, one is impressed with the notion that he is dealing

with a severe, ulcerative type of diphtheria, or with mercuric stomatitis, or scurvy. As the diseased process advances, the ragged, deep, ulcerating, bleeding, crater-like lesions develop on the gums, sides of the cheeks and tonsils; the teeth become loose and the picture suggests to the diagnostician some rapidly developing malignant process like cancerum oris. Case I, previously referred to, presented in the later stages of the disease this clinical picture, and, in the recent case of one of our much beloved confreres blood smears from which were submitted to me for examination, the ulcerative, necrotic condition of the gums suggested trench mouth, and such was the diagnosis made early, prior to the systematic examination of the blood.

Sometimes these necrotic, ulcerative lesions center in the tonsils on one or both sides and throw the practitioner off his guard. In 1915 I saw such an instance (Case X). The man had been under observation for three weeks with the diagnosis of streptococcic tonsillitis. He had a foul breath, ragged, deeply ulcerated, gangrenous looking tonsils, enlarged cervical glands and a few petechial spots upon his face. His leucory count was 240,000 with 98.5 per cent mononuclears. The man died two days after he was seen.

In Case XI a male clerk 26 years of age whom I saw with Dr. W. H. Condit, the history of repeated attacks of tonsillitis preceded the onset of the nasal hemorrhages. The leucocyte were 42,000 with 85 per cent large and small mononuclears.

Not all the cases of the type of the disease without leucocytosis exhibit hemorrhages from the mucous membranes. I have had recently under observation a girl of twelve years, referred by Dr. A. T. Ridgway of Annandale, Minn., (Case IX) which presented in all respects the clinical symptoms and blood picture of acute lymphatic leukemia, but without hemorrhages from the mucous membranes or from the stomach or intestines. In this case the lymph glands were not sufficiently enlarged to attract one's attention, but, by palpation, they were from pea to almond size in the neck, axillae, and groin. Careful search for hemorrhagic areas in the skin and mucous membranes was negative, except for one or two pin-head size hemorrhagic spots on the soft palate. The com-

plete blood examination in this case established the diagnosis beyond question. The leucocytes were 3,800, while the large and small mononuclears at various examinations ranged between 84 and 90 per cent.

A study of the clinical features in that form of the disease associated with high leucocytosis presents variations sufficient to keep the clinician upon his guard lest he fall into error. These cases as a rule run a slower course and more time is allowed for securing data and establishing conclusions which time does not modify. In some of these slow, persistent nose-bleed and bleeding from the gums is a conspicuous feature. In 1910 I saw with Dr. Walter Sheldon such a patient (Case VI). He had been ill about two months with fever and weakness. He was having severe and persistent nosebleeds and also some bleeding of the gums. His leucocytes were 35,000, of which over 75 per cent were of the mononuclear variety, the large forms predominating. He died three weeks later. A curious feature in this man's blood was the drop in leucocytes as the disease progressed, a few days prior to death, the count being only 7000. The development of multiple, raised nodules in the skin, lymphocytoma (Warthin) may be a conspicuous feature of some of the cases of this type. Some years ago I saw with Dr. John Butler a remarkable case of this form of the disease, (Case VII) which he has reported. The patient was a single woman of thirty-five years. Four months prior to my visit an ulcerated tooth had been removed leaving a bleeding socket, which did not heal well. From that time on she felt tired, had severe neuralgic pains through the shoulders and arms, and developed a little fever. Seven weeks after the onset, a raised nodule appeared in the skin of the flexor surface of the right forearm. A few days later a similar nodule appeared on the back. At the time I saw her, there were great numbers of these in the skin over the entire body. They were from pin-head to filbert size, had a soft, doughy feel, and were not tender to touch. Over the face they were so numerous as to create folds in the skin and give the lion-faced appearance of leprosy. Curiously enough, while the diagnosis of acute lymphatic leukemia was suspected in this case, at the time I saw her it could not be established by blood examination, since the



leucocytes were 3000 and the mononuclears, large and small, 28.5 per cent. Blood examination made in the later weeks of the disease presented the characteristic picture, with leucocytes rising to 52,000 and mononuclears to 96 per cent, the large forms predominating. This type of the disease is not so rare. It may run an acute or more chronic course. There were similar nodules in Case IV. and in a case which I saw some years ago in the Minneapolis City Hospital service, a man forty-eight years of age, with fever and marked anemia, the notes on which are too fragmentary to report. There were many of these nodules composed of large mononuclear cells in the skin of the forearms and thighs.

In some cases, the skin lesions present a honey-combed surface with underlying necrotic areas. This was a conspicuous feature in Case XI. Over the hips and sacrum, pea to half dollar sized raised blebs first appeared. A few days later these became honeycombed with small openings leading into underlying necrotic, black looking ulcers in the corium.

Inasmuch as the hemorrhages, with or without lymphocyte infiltration, occur in other structures than the mucous membranes and the skin, remarkable clinical phenomena arise in the course of the disease. In Case XI, disturbances of vision and hearing occurred, probably due to hemorrhages into the sheaths of the auditory and optic nerves. In Case III, the right arm and leg were paralyzed, due to brain hemorrhages either into the ventricles or the arm and leg center upon the left side. In this case also the right eyeball was rotated outward and upward. Cases VIII and III vomited blood and passed blood by bowel, probably due to ruptured vessels in the stomach and intestinal wall. Case III passed bloody urine, while in a case seen with Dr. D. C. Cowles the notes of which are too fragmentary to report, there was bleeding from the vagina. Retinal hemorrhages were present in Cases II, III and VI. Some of the patients complained bitterly of pain along the course of the nerve trunks. In Case XIII pain and stiffness in the left leg was an early symptom. Case IV had severe persistent pain in the back and legs, Case VII a dull, heavy pain in the back of the neck and in the shoulders and arms. Case XIV had as an early symptom pain

in both legs, Case XI had abdominal cramps, while in a man about forty-five years old, whom I saw with Turek in Vienna, a severe persistent headache ushered in the disease.

I have endeavored to present a clinical picture of the many manifestations of this remarkable disease which will, I hope, assist in its more general recognition. Since all the cases die within a few days or weeks, the correct diagnosis is of importance in order to establish the prognosis. The writer, from personal experience, can sympathize with the clinician who makes the diagnosis of scurvy or diphtheria or trench mouth or purpura simplex or purpura rheumatica, all diseases of relatively low mortality, and finds to his horror that the case is one of acute lymphatic leukemia, with death only a few days or weeks away. The diagnosis is rarely absolutely established without the blood picture, including a differential leucocyte count. The clinical picture which the disease in full bloom presents is rather characteristic. As Bradford and Shaw state, having once recognized the first case, the others are readily interpreted. A number of times the writer has correctly suspected acute lymphatic leukemia, from a clinical study of the case, but never could summon the courage to state his conclusions positively without the knowledge which the blood examination could furnish. The cases without leucocytosis or with leucopenia resemble very closely aplastic anemia. The enlarged spleen and swollen lymph glands in leukemia are the important points in differentiation. Those cases in which the lymph glands hypertrophy late in the disease, of which I have observed three, are very puzzling. However, attempts at such fine clinical differentiations are largely academic since the etiology of neither aplastic anemia or acute lymphatic leukemia is known.

**Case I.** Willie B., 10 years of age, male, school-boy. Had been a weak child from infancy. On February 17th, 1897, while attending school, began to have a toothache and was sent home. A few days later he began having fever, the gums commenced to bleed, and an ulcer appeared upon the gums. Examination one week after the onset revealed a poorly nourished boy, waxy, pale skin, white mucous membranes with oozing, necrotic looking gums, pea to bean sized glands of the neck and submaxillary region. His temperature was 104, pulse 120. The spleen was enlarged to percussion, but could not be palpated. Liver not enlarged. The heart was nega-

tive. There were signs of an old, inactive tuberculous process in the left apex of the lung. No petechiae upon the skin. The boy was observed until his death eleven days later. He ran a high temperature, 102 to 105 degrees, throughout the course of his illness. A slow oozing from the nose and gums continued off and on until death. Considerable pain was complained of about the jaws and face. The breath was very foul. The gums were friable and necrotic, bleeding easily when touched. A purpuric rash appeared on the chest three days before death. The lymph glands of the neck were enlarged at the outset and those in the axillae and groins became enlarged before death. Bacteriological studies of the necrotic exudate from the gums and tonsils were negative for bacillus diphtheriae. The urine was negative except for albumen. Diazo reaction negative. Widal reaction negative. No blood studies were made. During the course of the disease, typhoid fever, septicemia, diphtheria, scorbutus, and carcum oris were considered, only to be ruled out. The autopsy made twelve hours after death disclosed no adequate cause for death. There was an old healed tuberculous lesion in the left lung. A few petechial hemorrhagic spots were present over the pericardium and the pleurae. The post peritoneal lymph glands were enlarged, as also those of the neck, groins, and axillae. They presented the appearance of haemo lymph nodes. No pathological studies of the tissues were made. I regret that the incomplete clinical and pathological report of the case does not permit of a careful diagnostic differentiation. The similarity in the clinical features of the case to others reported later leads me to unhesitatingly classify it as one of acute lymphatic leukemia.

**Case II.** Mr. T., (Seen with Dr. C. J. Ringnell) twenty-two years of age, single, University student. Family history negative. Always been a strong robust young man. One year ago at the Freshman-Sophomore class fight was hit on the right foot with a piece of wood. The foot became infected and the boy nearly lost his life with acute septicemia. His recovery, however, was complete in about two month's time and he remained entirely well up until April 26, 1906. He began then to feel languid and his friends told him he was getting pale. He kept at his work for about one week and began to have nosebleeds. The bleeding was of a rather slow, oozing character. The first day he used eight or ten handkerchiefs. He then consulted Dr. C. J. Ringnell who found him with a fever of 99.8, slightly enlarged spleen, and a nose full of gummy, black clots. Typhoid fever was suspected and he was sent home and to bed for further observation. No rose spots, however, appeared. The Widal reaction was negative. The boy became very pale and anemic and continued to run a temperature between 99.5 and 102. The diagnosis of typhoid fever could not be established. Patient was seen in bed three weeks after onset. He was extremely anemic. His face had a puffy appearance.

The whole body presented the lemon yellow appearance of pernicious anemia, the mucous membranes, being pearly white. There was some oozing from the nose of a pale bloody serum. No enlarged lymph glands could be palpated. The liver was palpable just below the costal margin. The spleen was enlarged and could be felt at the costal margin. Temperature 101. Examination of the blood showed the leucocytes 3000, red cells 2,050,000, hemoglobin 28 per cent, slight poikilocytosis, no nucleated reds. Differential: Small Monos. 76.9 per cent, Large Monos. 16 per cent, Polys. 6 per cent, Eosin. 0.0, one mast cell and two myelocytes seen in counting 355 cells. In spite of the absence of enlarged lymph glands, the diagnosis of acute lymphatic leukemia was made. Patient was observed for eleven days time until his death. Fever was continuous throughout, ranging as high as 105 towards the close. The slow oozing from the nasal mucous membrane continued. The spleen remained enlarged. About one week prior to death, the glands of the neck, groins, and axillae began to enlarge, but at no time during the course of his illness were they larger than from pea to bean size. Blood examination made four days prior to death showed the hemoglobin 25 per cent leucocytes 4000. Large Monos. 66.2 per cent, Small Monos. 32.4 per cent, Polys. 1.4 per cent, No eosinophiles, no mast cells, no nucleated reds seen. No hemorrhages into the skin were observed. No hemorrhages from the stomach or bowels. At the autopsy fourteen hours after death, the following were noticed: The skin was a lemon yellow color. A purpuric spot the size of a bean on the lower lip. Lungs negative except for hypostatic congestion at the bases. Heart somewhat enlarged. No valvular defects. An enlarged gland the size of a filbert was seen just below the greater curvature of the stomach in the omentum. Postperitoneal lymph glands were much enlarged and surrounded the aorta in a mass the size of a hen's egg. The mesentery lymph glands were enlarged, also those in the groins, axillae, and supraclavicular regions. The gastrointestinal tract was negative except in the cecal end of the ileum, where one or two superficial ulcers the size of a dime were noted. Stomach and pancreas were normal. Liver and spleen were enlarged, the spleen being twice the normal size. Both kidneys showed hemorrhagic areas at the cortices. In the liver two well marked, V shaped areas extending from the cortex toward the interior were seen. Bone marrow specimens taken from the ribs showed the presence of large numbers of marrow cells of the hyaline variety. Pathological diagnosis—acute lymphatic leukemia, hypertrophy of the heart, hypostatic congestion of the lungs, hypertrophy of the lymph glands of the mesentery, axillae, groins, supraclavicular regions, and postperitoneum, ulceration of the small bowel, purpura of the skin of the lip.

**Case III.** James P., (Seen with Dr. H. B. Annis) 18 years, single, student. Family history negative. No serious diseases as a child, although not very



strong. Never had tonsillitis or articular rheumatism. Three days prior to the onset of his illness he complained of feeling tired. On the morning of November 9th, 1917, after a fair night's rest, he noticed some dark blue spots upon his lower limbs. They were equally distributed over both legs below the knees. The next day he called the attention of his parents to the spots but was up and about the house. On that day his nose bled once or twice and he wiped some blood off from his gums. The spots had not increased in size. The third day a physician saw him and diagnosed purpura simplex. There was no fever and no vomiting. The gums bled again and also the nose. Urine passed looked smoky and contained blood cells microscopically. On November 12th a hemorrhagic area the size of a dollar appeared on the skin over the left hip. On the 13th he vomited blood. On that day he began complaining of his right arm and leg. He said they were partly paralyzed. He fainted on that day, going to the bathroom, and nearly lost consciousness. He was seen in consultation on that day. He was in a semi-stuporous state. Could be aroused enough to answer questions. There was some bloody mucous on the lips and slight oozing of blood from the gums. The right eyeball was rotated outward and the right pupil slightly more dilated than the left. The right arm and leg were completely paralyzed. There was no Babinski or Kernig. A fine purpuric rash was present on the legs from the knees downward. In the skin of the left hip was a large black hemorrhagic area nearly the size of the palm of one's hand. On the lower lip, a pinhead size purpuric spot was present, as also a half dime hemorrhagic area just below the suprasternal notch. A fine, half concealed purpura could be seen on the forearms. The vomited material contained streaks of blood. None had been present in the stools. There was no stiffness of the neck. Lymph glands of pea to bean size could be felt on either side of the neck, also above the left clavicle under the rami of the jaws, in the axillae, groins and epitrochlears. The spleen was enlarged and could be palpated just below the left costal margin. The liver could not be palpated. No masses were present in the abdomen. There was no fever. The leucocytes were 90,000, with a differential count of P. M. N. 1.5 per cent. Small Monos. 8 per cent, Large Monos. 89 per cent, Trans. 1.0. Eosinos. .25, Baso. 0, Myel. 0. 400 cells were counted. The clinical diagnosis of acute lymphatic leukemia was made. The boy died that day. Blood culture taken prior to death was negative. No autopsy was permitted.

Case IV. F. B., 32 years, male, laborer, married, three children. Admitted to City Hospital, Minneapolis, November 28, 1912. Family history negative. Denies venereal disease, except gonorrhea four years ago. Four years ago had some kind of a sickness with severe cramps in his stomach which lasted three or four days. A big lump appeared in the abdomen at that time which remained only a few days and then disappeared.

He was admitted to the hospital for marked weakness and raised lumps in the skin on various parts of the body. He stated that he began to feel sick about six weeks prior to admission. In the beginning he had diarrhea and pain in the abdomen. The nodules in the skin began to appear about one week later. They first appeared upon the legs, later upon the arms, then on the face and finally on the trunk. Six times in the last month he has had profuse nosebleeds. Three weeks ago he took to his bed on account of weakness. He had had no pain up to that time. Of late he has had pain in his back and legs. He does not know whether he had fever or not. His diarrhea has now stopped.

The physical examination reveals a large framed, broad shouldered man of stocky build. He is well nourished but shows a high grade of anemia in the pale yellow color of the skin and the white mucous membranes. There is bleeding from the nose and oozing from the gums, with black clots in the mouth around the gums. One's attention is at once attracted by the nodules in the skin. These are present all over the whole body, except on the hands and feet, and the exterior surfaces of the knees. They vary in size from seven to eight mm. They are raised above the surface of the skin and are of a soft, doughy consistency. They can be moved over the underlying tissues. They are most numerous over the chest and forehead, where they appear about one mm. thick over the thighs, abdomen and legs, and to a lesser degree over arms and forearms. Each nodule is surrounded by a purplish hemorrhagic zone one to 2 m.m. in diameter. Over the ventral surface of the chest and forehead many nodules show no hemorrhagic zone. On the first metacarpus of the right hand is a nodule thicker and firmer than the others. The lymph glands of the neck, groins, and axillae are palpable and of pea to filbert size. The physical examination was otherwise negative, except slight enlargement of the liver and spleen. Temperature 101 degrees. Pulse 102. The urine was negative. Blood showed R. B. C. 2,464,000, hemoglobin 29 per cent, W. B. C. 6,000. Differential count—P. M. N. 37 per cent, L. Monos. 31.6 per cent, S. Monos. 31.6 per cent, Eosino. .8 per cent.

During most of the time the patient complained of pain and stiffness in his back, neck and limbs. He had continuous fever, 99 to 101 degrees. He gradually grew weaker. On the fifteenth day in the hospital he passed three tarry stools and had a profuse nosebleed, lasting six hours. Toward the close he developed delirium and died on the seventeenth day in the hospital.

Summary of autopsy findings. (Dr. S. M. White, pathologist.) Skin—many soft raised nodules in the skin over the whole body except hands and feet. Abdominal cavity—postperitoneal and mesenteric lymph glands enlarged and hemorrhagic. Pleural cavities—fibrous adhesions on left side. Pericardial cavity contains 15 c. c. of clear serum. Three or four minute hemorrhages on diaphragmatic surface. Oesophagus

—negative. Thyroid—negative. Lungs—no area of consolidation; cut surface exudes frothy serum. Heart—epicardial surface near base shows numerous minute fresh hemorrhages; normal in size. Aorta—negative. Spleen—somewhat enlarged; pupil soft, purplish color; kidneys negative except that pelvis of kidney shows two or three hemorrhages in the mucous membrane. Liver—weight 2470 gms; slightly enlarged; adhesions over right lobe. Pancreas—negative. Stomach—a number of small nodules in the stomach wall near the pylorus and in the body. Bone marrow of ribs normal color and consistency.

**Autopsy Diagnosis.** 1. Purpura hemorrhagica with erythema nodosum. 2. Hemophilia. 3. Minute hemorrhages into the pericardium, epicardium, and mucous membrane of right renal pelvis. 4. Marked anemia. 5. General lymphadenopathy. 6. Chronic perihepatitis. 7. Fatty degeneration of liver. 8. Acute splenic tumor. 9. Lymphoid nodules in gastric mucosa.

**Bacteriological examination.** Heart's blood a gram positive coccus and two varieties of gram positive bacilli and streptococcus pyogenes (?) Streptococcus pyogenes (?) obtained in pure culture from the skin of the leg.

**Histological examination.** Small intestine lymphoid hyperplasia. Liver—periportal connective tissue infiltrated with plasma cells. Adrenals—lymphocytes in medulla. Lymphnodes—sinuses packed with phagocytic endothelial cells. Skin nodules—infiltration with lymphoid plasma and phagocytic endothelial cells.

**Case V.** Mrs. L., (seen with Dr. H. M. Scheldrup) age 35, married, two children, Jewess. Family and past history negative up to two months ago. At that time, although previously strong, she began to feel tired and showed a disposition to avoid exertion. She had had no sickness that could account for her weakness. She became quite pale and was sent to a hospital but continued to grow weaker, paler and more prostrated. She could not sleep and had occasional vomiting spells. Her temperature ranged between 100 and 104 degrees. At this time her red cell count was 1,670,000, hemoglobin 25 per cent. White cells 16,000, with about 80 per cent large and small mononuclears. There were a moderate number of megaloblasts and normoblasts seen.

When first seen she was lying in bed, very weak and pale. She was fairly well nourished. The left nostril was packed with cotton to stop bleeding, which had started that afternoon. No bleeding of gums, no purpuric spots. One or two small lymph glands were palpable above the clavicles on either side. The only other abnormal findings were a soft systolic bruit heard at the apex and over the body of the heart, and a mass lying in the left lower abdomen, apparently arising from the pelvis and extending two cms. above the pubic arch. It was rounded and tender. Pelvic examination showed a hard indurated cervix and immovable uterus, but no distinct mass or fluctuation could be made out. Liver and spleen were not enlarged. No edema of legs or ankles. Blood exami-

nation now showed 32,000 leucocytes, 1,200,000 reds and 15 per cent hemoglobin. The differential count showed about 80 per cent mononuclears. Blood culture and urinalysis were negative.

**Case VI.** Mr. E., (seen with Dr. Walter Sheldon) age 40, married, one child. In the carriage business. Family history and past history negative. The patient had not been well for over a year, during which time he had had a great deal of business worry and hard work, entirely indoors. The winter before he was seen, he had been south and, while away, developed a severe nasal infection and was bothered for several weeks with a purulent discharge from his nose. About two months before the examination, he began to lose strength and grow pale in color. One morning, while dressing, he nearly fainted. He finally became so weak he went to bed. He had had considerable nasal discharge all this time and several severe attacks of epistaxis. The gums had bled once. The examination disclosed a fairly well nourished man, pale mucous membranes, and a lemon yellow color of the skin. He looked weak and was easily tired by talking. His temperature was 101. There was no discharge from the nose. Eyegrounds showed small hemorrhages in the retinae. The rest of the examination was negative except for three or four pin head sized purpuric spots on the inside of the right arm, and one or two the size of a dime below the knees. These were dark brown in color and looked like bruises in the skin. They were not over the shins. The leucocyte count, when first observed, was 35,000, with 75 to 80 per cent mononuclears. The blood examination at the time of my examination showed a leucocyte count of 15,000. Red cells 2,400,000. Hemoglobin 15 per cent. A differential count showed fully 90 per cent mononuclears, the predominating type being of the medium and large forms. The patient died three weeks later. Before death the leucocytes dropped to 7000.

**Case VII.** Miss R., (seen with Dr. John Butler) age 35, single, American, stenographer. Family history and personal history negative. Had never been sick before. Had weighed 135-140 before illness. About four months before the time this patient was seen, she had had an ulcerated tooth removed. The wound did not heal promptly, but bled a little for several days. From this time she began to feel tired and lose weight, although previously she had been a very active and indefatigable worker. She continued running down and by the end of six weeks had begun to have a dull, heavy pain in the back of her neck. This pain gradually spread into her shoulders and arms and in one week had worked down to the waist. The pains became sharp and finally she became unable to move the arms, except with great effort and discomfort. The arms and hands felt cold, but perspired profusely. Temperature at this time was said to be over 100. At this time (7 weeks after onset of symptoms) a raised nodule appeared in the skin of the flexor surface of the right forearm. This was not red or painful, and although small at first,



steadily grew in size to about that of an almond. Shortly after another nodule appeared on her back, between the shoulders. During the following month, the pains of which she had complained, spread into the hips, legs and feet. Fever and loss of weight continued. No more nodules appeared in the skin until the end of the month, when numerous small tumors developed in large numbers on the face, then on the extremities and finally upon the trunk. Only the palms and soles were free from nodules by the end of a week. Since that time the nodules had steadily increased in size and number, and loss of weight had been progressive. The only favorable sign was a cessation of the pains in the limbs, except for a very few attacks. Her knee joints and some of her finger joints became swollen and stiff. She was greatly bothered by night sweats. Had never had nose bleed.

Upon examination, a tall, thin, intelligent looking girl was seen lying in bed, dreading to be moved. Pupils reacted to light. Knee jerks present. The skin presented a most remarkable appearance. Over the entire body were scattered enormous numbers of soft, doughy, raised nodules, varying in size from that of a pin head to two cm. in diameter. Over the face the large number of nodules threw the skin into folds, thus simulating the Lion Face of Leprosy. Many of these, especially on the lower extremities had a bluish color. Sometimes these became more pinkish in color, the patient stated. The nodules were not tender to touch and were not distributed especially along nerve trunks. Careful examination failed to reveal any swelling in the long bones or lymph glands, and the liver was not enlarged. The spleen was just palpable at the costal margin. No masses to be made out in the abdomen. Heart and lungs negative.

Blood examination showed, Hgbl. 55 per cent, R. B. C. 2,750,000. WBC. 3000. Differential P. M. N. 67.0. Large Lymph. 3.5. Small Lymph. 26.0. Trans. 0.5. Eosin. 2.0. Turck's stim. 1.0 per cent. Two megaloblasts seen in counting 200 cells. Anisocytosis, poikilocytosis and polychromatophilia were present in moderate degrees.

A section taken from one of the nodules was diagnosed non-pigmented sarcoma of the skin. Urine showed a very faint trace of albumin, otherwise negative.

During the succeeding five weeks the patient's condition rapidly became worse. Emaciation became extreme, hearing became greatly impaired and she could not speak above a whisper. The nodules had increased in size and blood taken at this time gave the following picture: Hgbl. 24 per cent. R. B. C. 1,900,000. WBC. 52,000. Differential: P. M. N. 3.5. Large Lymph. 91.5. Small lymph. 4.5. Trans. 0.5 per cent. One normoblast and one megaloblast seen in counting 200 cells. Poikilocytosis, anisocytosis, and polychromatophilia marked.

**Case VIII.** Baby N., eight months of age, female, a well child until six weeks prior to the time she came under observation, when the parents noticed a change

in color of the child's skin to a waxy white. She became restless, weak, developed fever ranging between 99.5 and 101. Numerous petichiae appeared on the forehead and on the lips. These were followed by hemorrhagic spots on the dorsum of the tongue and the buccal mucous membranes. On the abdomen, over the right anterior superior spine of the ileum a large black and blue spot the size of a quarter appeared. Many small, pinhead sized purpuric spots later came out on the skin of the abdomen. The liver and spleen were both palpable about one finger's breadth below the costal margin. At first no enlarged lymph glands were noted, but one week prior to death bean sized glands could be palpated in the neck on either side, in the groins and in the axillae. The temperature upon the seventh day of observation reached 105.4, dropping to 101 before death. The child vomited blood and passed blood in the stools three days before death. The leucocytes were 18,000. P. M. N.'s 8.85, Large Monos. 4.73, Small Monos. 85, Myel. 1.43 per cent, a few microcytes, macrocytes, poikilocytes, and one normoblast were seen in counting 200 cells. The clinical diagnosis of acute lymphatic leukemia was made. The child passed into an asthenic, markedly anemic state and died after an illness of seven weeks. A complete autopsy was not allowed. No gross pathological lesions were found in the heart and lungs except fine, pinpoint hemorrhages in the pleurae and pericardium. The spleen and liver were enlarged, also the postperitoneal lymph glands. A specimen of bone marrow taken from a rib showed large numbers of mononuclear cells and many eosinophile cells. The presence of the eosinophile cells in such large numbers in the bone marrow I had never seen before. Every third or fourth cell seemed to be an eosinophile. The pathological examination confirmed the clinical diagnosis.

**Case IX.** Nannie G. (Referred by Dr. A. T. Ridgway) 12 years of age, Scandinavian. Family history negative. Diphtheria at eight years of age. Influenza in the winter of 1919. Father states the girl has looked white all summer and has seemed languid and weak and has complained of some aching pains in the limbs. Has had no nosebleeds or bleeding from the gums or any spots in the skin. Five weeks ago Dr. Ridgway was consulted, who found the patient had considerable fever, temperature 100, and a well marked anemia, and enlargement of the spleen and liver.

Examination today, Sept. 4, 1920, shows a rather thin, poorly nourished child. Color of the mucous membranes of the skin shows marked anemia. Physical examination negative aside from fever, temperature 100, marked anemia, a few purpuric spots upon the soft palate, enlarged lymph glands in the neck on both sides, also in the axillae and in the groins. These are from pea to almond size. The liver is palpable two to three finger's breadths below the costal margin. Spleen is palpable one finger's breadth below the costal margin. The heart is en-

larged, left border of cardiac area of dullness being one cm. outside the nipple line. There is a systolic blowing murmur at the apex area, transmitted to the axilla, with an accentuated pulmonary second sound. Blood pressure 98 systolic, 70 diastolic. Urine negative. Blood—hemoglobin 24 per cent, Reds 1,056,000, Leucocytes 3,800, P. M. N. 13.5, Small Monos. 53.0, Large Monos. 31.5, Trans. 1.5, no eosino., no baso., myelocytes 0.5 per cent, slight polychromatophilia, some poikilocytosis, no nucleated reds seen. Wassermann negative. Blood culture negative. Blood examination made Sept. 8th showed leucocytes 3,500, P. M. N. 9.0, Small Monos. 57.5, Large Monos. 33.0, Trans. 0.5 per cent. Clinical diagnosis acute lymphatic leukemia. The subsequent history of the case is not known.

**Case X.** Mr. H., age 35, single, Jewish. Family history negative. Patient had always been well. He had lues when 26, for which he received treatment.

At the time when first seen he had been sick about three weeks, during which time he was believed to have a streptococcus sore throat. When examined, his tonsils were seen to be badly infected, edematous and shiny. The cervical glands on both sides were enlarged. His temperature was 103.5. He was at times irrational. A few subcutaneous hemorrhagic spots were present on the face and nose. No other signs of organic disease could be detected. Acute lymphatic leukemia was suspected and the blood examined. It showed 65 per cent hemoglobin, 3,800,000 red cells, 240,000 leucocytes. Differential: P. M. N.'s 0.0, large lymphocytes 38.0, small lymphocytes 60.5, unclassified 1.5 per cent. No transitionals, eosinophiles or basophiles. Patient grew rapidly weaker and died in coma two days later. No autopsy was permitted.

**Case XI.** Mr. B. (seen with Dr. W. H. Condit) age 26, single, mail clerk. Family history and personal history negative, except for frequent attacks of tonsillitis and nosebleeds years ago. About that time he began to get weak and had to give up work and go into the country for four or five months. Felt better after the rest and went back to work. He became weaker and more prostrated and three months later gave up work entirely. During the past year he had had some disturbance of his stomach and had been pale, but had no other distinctive symptoms, up to three months ago. At that time ecchymotic spots had appeared on both ankles and he was running a fever. The prostration became severe and the man continued to grow paler and temperature higher, and six weeks before the examination he had had several severe hemorrhages from the nose. The nosebleed became more frequent and required packing to control the hemorrhages. His condition became grave.

Upon examination, a pale, greatly prostrated young man was seen. He complained of disturbance of vision and hearing. There was a purpuric rash over the back, and necrotic areas varying in size from a pea to a half dollar were present over pressure points, hips and sacrum. These had appeared first

as blebs over the skin, which had broken, and underneath a superficial necrosis of the skin had taken place. Small holes had punctured through into the subcutaneous tissue in various places. They were not bedsores. The liver and spleen were enlarged, each reaching one finger's breadth below the costal margin. There was slight enlargement of the cervical lymph glands, and also the axillary, most marked on the left side. These glands were isolated and not tender. No other enlarged glands. A complete physical examination was not made on account of the patient's weak condition.

The blood examination had shown 2,300,000 reds, 44 per cent haemoglobin, and 42,000 white blood cells, of which 85 per cent were of the large and small mononuclear type. Cultures from the blood and from the blebs were negative for organisms.

**Case XII.** Mr. J., aged 36, married, Scandinavian. No children. In good health and at his work as a contractor until three or four months before, when he seemed to lose energy and was tired all the time. About one month before the examination a carbuncle formed on his neck. This was lanced and soon healed. However, the patient did not gain but continued to get weaker. A few weeks later he had a severe nosebleed. Following this he became weaker and went to bed. He continued to have frequent and severe attacks of epistaxis and his anemia became marked. His temperature ranged between 100 and 102. His appetite was poor. He had no diarrhea. When the patient was seen he was in bed and having nosebleed, and his gums had been bleeding for several days. His pulse was rapid and his temperature 101.5. He looked very sick.

Examination showed a greatly prostrated, anemic man. No purpura. Lymph glands in groins and in left axilla slightly enlarged. Liver and spleen not enlarged. Further examination was negative outside of the blood. This showed a leucocyte count of 19,300. The differential count showed large mononuclears 70, small mononuclears 6, P. M. N. 18, myelocytes 1.5 per cent. There were a few nucleated reds of all sizes. Polychromatophilia was present. The mononuclears were not of the extremely large type, but of moderate size. In many of them the nuclei filled up practically the whole cell, only a thin rim of protoplasm being visible. Some nuclei showed vacuolation. A few basket cells were seen. The protoplasm of many of the large mononuclears had a tinge of pink and a very fine basophilic granulation. The nuclei stained a deep or paler blue.

A diagnosis of acute lymphatic leukemia, rapidly fatal, was made. The patient died about two weeks later.

**Case XIII.** Martin C. (referred by Dr. A. T. Ridgway) three years of age, male, American. Two brothers living and well. Father and mother well. A breast-fed child. Never sick until the present ailment. Three weeks prior to the examination (December 21, 1917) the baby began to complain of pain and stiffness in the left leg. The mother stated



that he seemed to be sore along the shin. The next day he got stiff all over except his arms and could not walk. After a few days the stiffness subsided, but the child began to get very pale in color. His color had always been good before that. While the child was able to get about, he kept crying about his legs hurting and had no appetite. The legs did not swell or become paralyzed. For the past two weeks the child has been about the same, except that his color is getting whiter. He has had a number of nosebleeds and once he vomited blood, which the mother thought he had swallowed. On physical examination, the child looked well nourished but very anemic. The skin had a slightly yellowish tinge. He seemed very listless and languid. There was some bleeding around the gums. The lymph glands of the axillae, groins, and neck were palpable, but none of them larger than a bean. The spleen was markedly enlarged, the liver palpable one to two finger's breadths below the costal margin. There were no hemorrhages in the skin. There was some tenderness and swelling over the tibiae on both sides.

The urine was negative. The Wassermann reaction negative. The blood showed R. B. C. 1,336,000, haemoglobin 15 per cent, W. B. C. 260,000. Differential count—P. M. N. .25, L. Monos. 7.5, S. Monos. 92, Trans. 0, Eosinos. 0, Baso. 0, Myel. .25 per cent. Color index 0.56. No megaloblasts or normoblasts found. A diagnosis of acute lymphatic leukemia was made. The child was not seen again.

**Case XIV.** John K. (referred by Dr. Schroeder of Maple Plain, Minn.) Male, 4 years. German descent. Father living and well. Mother had anemia but is now well. Three brothers living and well.

The child had never been sick until about two months ago when he began to complain of pains in his legs. About four weeks after the onset of the pains in the legs, a purpuric rash appeared upon the legs which was preceded by an attack of vomiting. At this time the child developed temperature, which was normal in the morning but ranged as high as 101 degrees in the afternoon. The rash upon the legs lasted about ten days. The child drank a great deal of water but had no appetite. The bowels were constipated. He had lost much in weight and had grown feeble and weak and very pale in color. The purpuric rash appeared again upon the legs a few days prior to the examination. He had bled some from his nose at various times, but none from the gums or bowel.

The examination revealed a poorly nourished child with a very waxy white color of the skin. The child was so weak as to remain entirely indifferent to the examination, with its eyes closed. One or two small purpuric spots were present on the left arm just above the wrist and also on the back of the left hand. A dime sized black and blue spot was present over the left ankle. The spleen was enlarged, reaching one finger's breadth below the costal margin. The liver was palpable about three cm. below the ribs. A few lymph glands of pea size could be felt

in either axillae and on either side of the neck. No masses were palpable in the abdomen. No tenderness or roughening over the long bones. The urine was negative except a trace of albumen and a few hyaline casts. The blood picture was typical of lymphatic leukemia. Haemoglobin 15 per cent, R. B. C. 700,000, W. B. C. 26,250. Differential leucocyte count showed about 94 per cent mononuclears, large and small. The child died the day following the examination.

#### DISCUSSION

DR. J. P. SCHNEIDER, Minneapolis, Minn.: It is very seldom that we have an opportunity of gathering together fourteen cases of acute lymphatic leukemia. I think Dr. Head is to be congratulated and we all are to be congratulated on his list of cases showing the various forms which this disorder may take. After all, the type picture of acute lymphatic leukemia is met with but seldom, the aberrant forms being much more common. The great difficulty lies in the fact that we are dealing with a complex, the etiology of which is unknown. The safest criterium, as Dr. Head so well pointed out, is the blood picture very carefully studied but it does not suffice to ascertain the total lymphatic white cell proportion. Having 95 per cent of the cells of the large lymphocyte form is not sufficient. The point is, are they pathological cells and how high is the proportion of pathological cells, because we must always remember that there is a possibility of error in differentiating acute lymphatic leukemia from acute lymphadenitis which does occur and in which the count may be as high as 80,000, and in which 90 per cent will be large lymphocytes, and yet the patient recovers. Dr. Turck mentions five such cases in which he says that in a certain part of Austria he lost his reputation, for the patients all recovered. So it is plain to us that the proportion of pathological cells is what matters. This is particularly true in children in whom the lymph adenoid ring is involved.

The next phase which the Doctor pointed out is that at times the local condition is prominent, and in such conditions as these the glands may become larger and harder and more pronounced, and frequently the blood picture recedes, but the reverse is also true.

I think the location determines a great deal. If it occurs in the nose, throat, gastrointestinal tract and so on the out-swimming is easy, but there are places where the out-swimming is not easy. Occasionally it is found principally in the spleen; occasionally retroperitoneal, and finally there is an out-swimming which will be pronounced.

Another point which Dr. Head did not bring out is the early help we can get by an ophthalmoscopic examination. In a patient seen not long ago with supposed pernicious anemia the ophthalmoscopic examination gave me the clue that it was an acute or subacute leukaemia. The findings are highly characteristic.

DR. H. Z. GIFFIN, Rochester, Minn.: I am very

much interested in the timely presentation of this subject. There is no doubt that the diagnosis of cases of acute leukaemia is frequently missed. The cases concerning which there is most confusion are those which simulate acute septicemia and acute ulcerative endocarditis. Cases with acute stomatitis present themselves before a typical blood picture has developed. I remember one patient who came with cerebral hemorrhage in whom the diagnosis was easily made from the blood picture. There has recently been under observation a patient with clinical symptoms suggestive of acute leukemia in whom the blood picture was not typical, even just preceding death. The absence of extreme leucocytosis is not rare. On the other hand, we see cases of simple pyogenic infection associated with leucocytosis and a high lymphocyte and mononuclear count which are not leukaemia; the blood picture later becomes normal.

I would like to emphasize the importance of a careful study of the blood smear. A study of the morphology of the blood renders relatively easy in most instances the recognition of immature forms and stem cells, upon which a diagnosis depends.

DR. E. L. TUOHY, Duluth, Minn.: I rise to discuss this paper briefly because during the past winter I saw in the space of one month three cases typical of lymphatic leukemia. One case started out with what was taken to be severe sciatic pain. This patient evidenced at no time severe hemorrhages, but went on with rapid prostration to death.

The second case began with bleeding, suggesting an ordinary purpura, with hematuria, bleeding from the bowel, and developed a severe condition of the gums.

The third case I saw when the patient was about to die and in that individual there had been a lesser degree of hemorrhage, chiefly from the bowel.

I am impressed with what Dr. Schneider just spoke of, the necessity of studying these calls as to their pathological imprint: In all of these instances the cells were unusually large, the nucleus deeply strained and nearly filling the cell with only a lesser outer ring of faintly staining protoplasm. And by that same token I am led to go back to a certain case seen with Dr. Rowe some years ago that had a very large percentage of large lymphocytes, but I do not recall whether they bore the pathological imprint or not. The child was alive some months later.

In view of the fact that I saw three of these cases in such a short time it occurred to me that there might be some connection with the epidemic of flu that we had just passed through.

DR. L. A. NIPPERT, Minneapolis, Minn.: We are certainly under obligations to Dr. Head for bringing this very important subject to us, because it is a disease that is not at all characteristic. It has to be hunted for and the abnormal features are the ones which are most puzzling. Furthermore, the establishment of the disease means an absolutely fatal prognosis. So many different manifestations will mislead you, as the Doctor has mentioned, and, as he also

mentioned, one of our beloved confreres recently died of this disease. I will take the liberty of relating this case because it is one of great interest. The Doctor had been south and came back with a sore mouth, which was diagnosed as Vincent's; the spirilla were found. When I saw him he had this condition and a leukopenia, the white cells showing 3,000. The question was whether it could be a case of Vincent's bacilli with this low blood count. Then the differential count was made and it was shown that 90 per cent were large lymphocytes. With this finding there was no question but that the prognosis was fatal. There was no enlargement of the glands and very little of the spleen. His mouth was swollen like a stomatitis; there were no hemorrhages and the fever was of an irregular type. The leucocytes finally increased to 12,000, of which 90 per cent were large lymphocytes.

From the few cases I have seen I am more impressed with the fact that when anyone has symptoms of sepsis an examination should be made to exclude this disease.

DR. J. W. ANDREWS, Mankato, Minn.: I have always recognized the difficulty of diagnosing acute lymphatic leukemia, and as I hear the discussion of these men, all of whom live in the cities and have great opportunities for diagnosis, I am further impressed with the difficulties the country practitioner is under in diagnosing this fatal and very important disease.

As to the blood picture, Dr. Head has told us, and others, that there may be a very high leucocytosis and that there may be a leukopenia. In typhoid we surely get leukopenia and in appendicitis and other infectious diseases a high leucocyte count. What are the symptoms, I ask myself as I hear these gentlemen discussing the disease, what are the symptoms that the country practitioner is going to rely upon to get a diagnosis? I want you all to recognize the difficulty under which the country practitioner is laboring in diagnosing these obscure diseases. He does not make a blood count and without the blood count and the differential count he is much at sea in his diagnosis. Dr. Head tells us that sometimes the lymph glands are enlarged and sometimes not, and that it is in the latter part of the disease that they are enlarged. I would like to ask Dr. Head if it is not true that in the late cases of lymphatic leukemia this condition exists, would not a careful examination in the early stage reveal enlargement?

I have nothing to add to the splendid paper and splendid discussion we have had. I was about to make a motion that Dr. Head be given further time, for this is very important, probably more important, than any other subject that will come before this meeting. I shall be glad if he may be given a little more time to clear up some of the points that are so obscure to the country practitioner, and I should also like to hear a little more from the country physicians.

DR. MOSES BARRON, Minneapolis, Minn.: Just a



short time ago I had an opportunity of studying at autopsy a child 2½ months old who had presented peculiar symptoms. About two weeks before death the patients eyes became reddened, swollen, temperature ranged between 101° and 104°, and swellings developed at the inferior maxillary regions on both sides. Small reddish nodules appeared over the body. The physician who was called could not make a diagnosis.

At the autopsy there were found nodules over the chest and abdomen, three to five mm. in diameter. The peritoneal lymph nodes were markedly enlarged, and tumor masses were present in both kidneys. At first, I was not entirely certain of the diagnosis of these masses, but microscopic study revealed their true character. It proved to be a case of lymphatic leukemia with infiltration into all the viscera including the corium of the skin. The entire trachea was also infiltrated with lymphoid cells. The nature of the lesion had not been recognized during life. No blood examinations had been made before death.

In the case that Dr. Nippert spoke of which was reported by Dr. Head, I examined some of the slides. though at first there was a leucopenia the leucocytes gradually increased in number to 12,000. An interesting feature in this case was the character of the cells themselves,—large lymphocytes rather embryonic in type with nucleoli present with in the nuclei of most of them. The presence of nucleoli within the nuclei of lymphocytes is an important factor in establishing the fact that the cells are abnormal in the blood and approach the "stem" cell type.

The invasion of the skin in leukemia is found more often in the chronic types of the disease. There was a chronic case recently at the University Hospital which showed an enormous involvement of the skin. Several hundred tumors were scattered through the skin, ranging from 3 mm. to 3 cm. in diameter. All of the palpable lymph nodes were also greatly enlarged. The histologic picture of the lymph nodes and the masses in the skin was that of leukemic infiltration. However, the blood picture was entirely normal; there was no increase in the number of leucocytes and the differential count was not altered. Some of the lymphocytes appeared abnormal in structure. The patient died within a short time after reaching the hospital, and at the time of death there was no leucocytosis present or anything at all patho-

logical in the differential count. The diagnosis at the time of death was aleukemic lymphadenosis.

I wish to emphasize the importance of studying the blood for immature cell types in suspected cases of leukemics and also the relative frequency of infiltrations into the skin in these diseases.

DR. GEORGE DOUGLAS HEAD, Minneapolis, (closing the discussion): I appreciate how crowded our program is and the Chairman was very generous with me in the time allowed for reading the paper, so that I will not consume much time in discussing the interesting points which the discussion has brought out.

I was glad that Dr. Tuohy spoke of the pain in the course of the nerve trunks in one of his cases. That was brought out in the part of the paper which I left out. A number of cases gave very severe pain, one in the jaw, another in the arms and shoulders, and others in the legs. Some of these required morphia for relief. The pain was evidently due to hemorrhage into the nerve sheaths. A case in point that I saw in Vienna with Turck was that of a man with persistent and severe headache, so severe that it required large doses of morphine to relieve. The man died in about two weeks from the onset of his leukaemia. There are many interesting features that we have no time to discuss.

One thing in relation to the point which Dr. Schneider brought up I would like to speak about. Of course, to a man who is experienced in blood work and to those who are examining blood smears all the time, the large pathological mononuclears may come into the foreground and be easily recognized, but for the average man who does not often make a differential blood count, I doubt if he would get much comfort in attempting to differentiate pathological mononuclear cells from those he sees in the normal blood. Such interpretations, I think, would have to be made by men who are working all the time in blood work. But I am very sure that when any one of you has once seen and recognized one of these cases of acute lymphatic leukaemia, the clinical features will be so striking that you will at once insist upon someone examining the blood for you, if you cannot do it yourself, whenever another case, clinically simulating the condition, is met with. There is something very suggestive about the clinical syndrome when once a case has been seen. I thank you.



# Physicians Income Tax

By A. H. Remole, Auditor of Physicians  
and Hospitals Supply Co., Minne-  
apolis, Minn. Formerly Divis-  
ion Chief Internal Revenue.

Income tax returns of the physician presents difficulties that are not met with in ordinary lines of business. Personal expenditures often overlap business disbursements and the distinctions drawn in this and other expense items are so often confusing that in his desire to avoid error the tax payer generally pays a larger amount than is necessary. Some of the following suggestions may seem so obvious as to be unnecessary, but an examination of physicians' returns has disclosed that probably a large majority err in not taking advantage of at least a part of the suggestions made.

Many professional men still report the gross amount of business done, in lieu of the actual cash collected for the year from professional services. The Internal Revenue Bureau permits the cash method and it is by all means advisable as few doctors have the time to keep books on a complicated accrual basis.

Expenses incurred in attending medical conventions and clinics may be deducted as a business expense. This would include transportation cost in full and the cost of subsistence and lodging in excess of what it would cost at home. Such traveling expenses are also allowed in all cases where the physician is called out of town in his practice.

Subscriptions to medical journals and magazines kept in the waiting rooms for the entertainment of patients are considered a cost of doing business and may be deducted. This applies also to professional society dues and to commercial club memberships. Fraternal society dues are not included unless membership is held solely for business reasons.

Where an office is maintained in the home it does not usually occur to the taxpayer that this is a business expense. The government so considers it, however. If the home is owned, a proportionate share of depreciation, light, heat and servants' salaries may be deducted. A rented home receives the same privilege, except that a proportionate share of the rent is taken in lieu of depreciation. For example, one room used as an office in a ten-room house would

entitle such a taxpayer to one-tenth of the costs named.

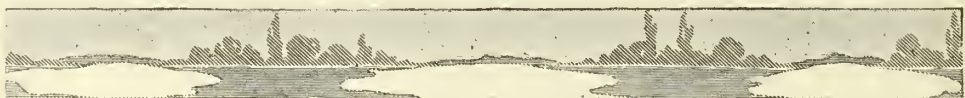
Telephone and telegraph costs run into considerable money in a years time. Some physicians take advantage of this permissible deduction, but very few consider the expense of maintaining the home phones. These are also considered as a business expense determined by the approximate business usage.

The physician probably uses his automobile for business a larger proportion of the time than any other class. The Income Tax Laws and Regulations permits a deduction in an amount determined by the amount of time the car is used professionally. Depreciation, gasoline, oils, storage, tires and minor repairs are the principal expense items allowed. Due to the hard usage that is given a doctor's car, a fair rate of depreciation is 25 per cent. A \$2,000 car used four-fifths of the time for business would entitle the taxpayer to four-fifths of \$500 as deduction for depreciation.

So much discrepancy is found in the amount of materials used by physicians having approximately the same professional income that one must conclude that full advantage is not always taken of these expense items. Gauze, drugs, antitoxins are only a few of such expenditures. Almost anything of this nature may be deducted. Such costs must not, however, include new instruments, furniture and books or other articles that are not actually consumed during the year. Instruments of such a nature as to be easily broken or lost may be included with other materials, however. Depreciation may be charged on instruments, books and furniture. This charge off may generally be computed at about five per cent for furniture and books and ten per cent on instruments. X-ray and similar machinery depreciates much more rapidly than instruments and a larger rate of depreciation may therefore be taken. If your experience shows that a certain electrical machine is gone in three years, take 33 1-3 depreciation on the cost.

On account of the rapid strides forward of the medical profession, it often happens that books and instruments become obsolete. In all such cases the Revenue Department will permit the taxpayer to charge off the original cost of such an asset less depreciation sustained.

In view of the fact that a physician need only report the cash taken in during the year as income, the Income Tax Regulations do not permit such a taxpayer to charge off as expense work done gratis, nor to charge uncollectible professional accounts. Collection expenses, which would include legal fees, postage, stationery and printing may, however, be taken.





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March, 1921

No. 3

## EDITORIAL

### JUSTICE IN MAL-PRACTICE SUITS

The present legislature has at the present writing two bills for its consideration which are of great importance to the medical profession of the state.

The one, reducing the statute of limitations from six to two years is familiar to the profession throughout the state and is obviously just. That a patient is able under the interpretation of the present law to sue a doctor for alleged mal-practice for services rendered as long ago as six years seems obviously unjust and lays the profession open to an unnecessary and unfair liability. Some judge, some time ago, interpreted the law, however, and this is justification from the law standpoint.

The second bill is the more important and, in brief, aims at a furtherance of justice abstractly and justice to the defendant doctor in particular. According to the present law, under what is known as Statutory Privilege all information acquired by a physician from his patient is considered strictly confidential and is not admitted as evidence in court. In our February issue we called attention to the desirability of preserving in general this confidential relation between physician and patient. However, when matters of a private nature are made public in court by a patient in a mal-

practice suit against a medical man, all reason for preserving the confidential nature of the individual's history is abolished. To withhold medical testimony which might be obtained from a physician who had subsequently or previously or even in conjunction rendered services to the patient and which might give a truer picture of the case either for or against the doctor sued, is unjust. It will be argued that physicians, through a certain esprit de corps, will testify to the disadvantage of the patient. It is not typical of the medical profession to perjure itself and we believe the alteration in this law would work for a furtherance of justice.

It is startling to note some statistics recently gathered by a prominent medical protective insurance company. These show that in 1918, 1 to 4 per cent of mal-practice suits instituted against the profession exceeded \$5,000.00. In the following year, 1919, the percentage increased to 35 and in 1919 the percentage jumped to 55. Do these statistics indicate that mal-practice is on the increase? Certainly not. Depreciation in money value of course accounts for it in some degree and perhaps the unsettled condition of the country in general comes in for its share. It may be taken, however, as an indication for the profession to bestir itself and support with considerable zest legislation directed toward the attainment of justice for itself.

### THE LATE OSTEOPATHIC BILL

The Minnesota legislature was only one of several state legislatures which had to consider granting the osteopaths the right to practice major surgery. We have every reason to believe that the question will be raised in the next legislature.

Osteopathy, founded upon an empirical assumption as to the cause of disease, has gradually broadened the scope, not only of its training in the fundamental medical sciences, but in its therapeutic activities. When an osteopath wants to do major surgery, however, and place the public at the mercy of doctors with much poorer qualifications than the average graduate of the medical schools (and every physician knows these are meager enough), it is up to the

medical profession and all others informed, to act for the welfare of the public.

This bill was obviously a short-cut to surgery and if passed, osteopathy would have attracted a certain type of man who is constantly on the lookout for short-cuts and the chance to get something cheap.

The remedy for what promises to be a continual tilt between medical sects, lies in the establishment of standard requirements for those practicing the healing art, be he surgeon, physician, dentist, osteopath, chiropractor or chiropodist. If an osteopath wishes to be a surgeon, let him meet the requirements.

Dean Lyon of the Minnesota Medical School, has called attention to the practicability of the State Board of Education passing on the eligibility in the fundamental sciences of candidates desiring to practice the healing art. Or, in Minnesota, where we have just one medical school, he believes the university may logically exert this function.

The soporific conditions of the State Medical Association, induced by the recommendations of the last legislative committee, received a rude awakening by the osteopathic bill. Some constructive legislation by the profession is in order to prevent a repetition of this recent experience with such dangerous legislation.

### CASE TAKING

The progressiveness of the Southern Minnesota Medical Association has been shown by an action at its last meeting, which attracted but little attention at the time—the appointment (to be formally voted upon at its Winona meeting next summer) of a Committee on Clinical Research, whose duty it shall be “to endeavor to establish systematic methods of case taking among all the members of the Association and particularly among those who are in general practice. This committee will also act in an advisory capacity to members of the Association who are encouraged to refer to them questions pertaining to the above clinical data.”

This action follows the recognition of what Sir James Mackenzie points out in *Oxford Medicine*—that the early stages of disease have not been given the attention they ought to re-

ceive, and that “until symptoms are classified on a basis having reference to the principles underlying their production, medical progress will be delayed.”

That the logical case taker is the general practitioner is evident. He it is who meets the patient first and who first realizes that the layman, though he may use the same words as the profession, may speak a different language. The clinician has been using for a varying number of years terms of definite scientific meaning; the layman has been accumulating a strange and marvelous melange of medical misinformation resulting in a distorted and nebulous vocabulary elusive of definition, for the interpretation of which the general practitioner in time compiles a glossary of pseudo-medical terms for each of his clientele.

In the examination of histories it frequently becomes apparent that not enough thought has been given to the underlying meaning of patients' expressions. If we examine more closely into the beginnings of disease, we note at the outset that subjective symptoms practically always precede objective signs and hence the words of the patient, who is usually a layman, furnish the important information. A closer and more critical scrutiny of the patient's words, than is usually given, is called for. It is a factor that enters constantly into the accuracy of histories. No word should be accepted at its face value; it is safer to consider all words descriptive of the body or its functions, when employed by the laity, as having a doubtful meaning until given a clean bill of health by one having intimate knowledge of the patient's peculiarities of dietion.

Investigation is difficult enough with the patient, harboring symptoms and giving verbal evidence of their existence, in our presence, but where we are once or more removed, either in the person of the patient, in lapse of time or both, our difficulties multiply. Internal evidences of erroneous elements in the anamnesis appear in many case records.

In many cases the patient may appear to be well posted in the terms used and, should he be on a level with or, perhaps, above the level of the clinician intellectually, recognition may not be had that such a layman is not an expert in this line of knowledge and that his words,



phrases, and partial diagnoses require close dissection.

As the primary articulate source of information is the individual patient, it is necessary either to learn what meaning should be attached to the apparently significant words he uses or to teach him the correct use of scientific terms. As Dr. William H. Smith says: "Pain must not be the reflection of the surgeon's or internist's idea of pain, but what the patient means by pain must be determined."

The work of the committee will be one of great significance in the progress of medicine and the general practitioner—erstwhile thought to be moribund—will take on a new lease of life with this new task which will indeed try his mettle.

H. B. A.

### WHITE SOLIDARITY

The world is at present dominated in all its commerce, government, science, by the white race. The maintenance of this commanding position depends on white solidarity. Such conditions of suspicion hatred and armed strife as have been occupying the world during the past few years, have kept the white races divided. A single, unsupported white nation might be overthrown by a restless one of another color.

If the Russo-Japanese war be considered in its significance as an inter-race strife, and study is given to the numerical strength of the various races, then some idea of the future possibilities of white overthrow may be gained.

White solidarity will never be secure so long as the various nations continue to compete with one another in armaments. Such rivalry for military and naval supremacy will not aid the white race in understanding one another, or having such commercial rivalry and economic unity as is necessary for solidarity and continued domination.

The tremendous cost and gigantic burden of taxation which would have to be carried by the nations in a competitive scheme of armaments would soon bankrupt the world. It would be better to limit armaments by international understanding and to make sure of racial unity, than by an excessive burden of taxation to endanger the peace which the armaments plan to secure.

Would it not be better, instead of spending 90 per cent of the world's income on armaments and less than 1 per cent on health, to turn these figures about, and trust that through the improved health of the people, a vast measure of protection would be afforded? Words fail to express the enormity of criminal foolishness displayed in the past by many nations in the enormous amount of energy spent in the prevention and cure of disease, only to raise better physical specimens for slaughter.

Are we, as a nation, not continuing to do much the same thing? We are very active in a multitude of public health activities, both for the prevention and cure of disease. The sum spent annually is insignificant when compared with, for instance, the naval construction plan in progress.

Improved health, limited armaments, some revised form of a league of nations will be sufficient to ensure to the white race its continuation of world domination.

C. E. S.

## NEWS OF THE HOSPITALS

Dr. F. L. Durgan, of Winnebago, has been appointed superintendent of the sanitarium at Nopeming, near Duluth.

The Board of Directors of St. Lucas Hospital, Fribault, has under consideration the plan of enlarging the building to double the present capacity.

Dr. Herbert O. Collins, superintendent of the General Hospital, Minneapolis, from 1909 to 1918, has been reinstated as superintendent, following the resignation of Dr. Walter E. List.

For conceiving and taking a large part in the work and building of the State Hospital for Crippled children, St. Paul, Dr. A. J. Gillette has been honored by the patients of that institution with the presentation of a full length oil painting of himself, done by W. W. Churchill of Boston. The fee of the artist was paid by the earnings of the older patients who work in the shop of the Phalen Park institution.



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## OBITUARY

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### DR. W. E. CHAPMAN

Dr. W. E. Chapman, Litchfield, Minn.; Vermont State University, Burlington, Vt., 1879; member Minnesota State Medical Association; died Feb. 5, 1921.

### DR. J. C. FARMER

Dr. J. C. Farmer, McKinley, Minn.; University of Minnesota; member Minnesota State Medical Association; died February 9, 1921.

### DR. L. A. WARD

Dr. L. A. Ward, Bemidji, Minn.; University of Illinois, 1895; aged 55; died January 16, 1921.

### DR. IRA LESLIE EDMUNDS

Dr. Ira Leslie Edmunds, Clearwater, Minn.; University of Michigan, and Rush Medical College, 1884; member Minnesota State Medical Association; died January 2, 1921.

### DR. FREDERICK R. MOSSE

Dr. Frederick R. Mosse of Rochester, Minn., was born at Sun Prairie, Wisconsin, November 1st, 1854, and died December 26th, 1920, in Rochester.

In 1869 he entered the Wisconsin University at Madison, where he graduated in 1874. In the same year he entered the Homeopathic Medical College of Chicago, received his diploma in 1877, and began practice in Rochester.

He was married in 1881 to Miss Flora L. Hurd, who, with one son, Frederick, survive him.

Thus for over forty years Dr. Mosse was a practicing physician in Rochester and Olmstead county. He was, for a time, a member of the board of pension examiners, health officer of the city, county coroner and physician, and a member of the library board.

"Dr. Mosse was known to those close to him as a refined gentleman. The number of intimate friends was not many, the doctor being too busy a man in his useful life to mingle as freely as some other citizens, but the strength of the friendships felt for him was all the stronger because of this fact. He served the public wherever he found it possible and wherever his abilities gained an outlet. As a professional man, he was everything that ethics demand. More than that, he was the doctor of no particular class. When the well to do called him, he was ready, but just as ready was he to respond to the call from some humble home where suffering existed, and scores and scores of times did he make such calls, knowing full well that there never could be any remuneration for his services. No kind of weather held him back. The quality of self sacrifice was large in him and if a man is remembered by the good that he does, the memory of Dr. Mosse will long be green in the community."

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## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### MINNEAPOLIS CLINIC WEEK

Minneapolis will hold its fourth annual Clinic Week beginning April 25, 1921. The clinics will be conducted much the same as in previous years, with a special effort at coordination of the medical and surgical sides. Diagnostic methods will be given special emphasis.

Clinics will be conducted daily until three o'clock each afternoon, and the afternoon program will begin at four o'clock. Minneapolis physicians will appear on the program between four and five P. M., and at five o'clock a visiting physician of national reputation will give a discourse.

The Oto Laryngologic Society will hold its banquet during clinic week, and the Hennepin County Medical Society has chosen this week for its annual banquet. The visiting physicians will speak on each of these occasions.

The attendance at Minneapolis Clinic Week has shown a marked increase from year to year, which is indicative of the interest shown by the physicians of the state.

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## OF GENERAL INTEREST

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Dr. P. E. Anderson, of Chicago, is now associated with Drs. Jacob and Benson in the Union Clinic at Willmar.

Dr. J. D. Lewis has been appointed chief of the eye, ear, nose and throat service at the Minneapolis General Hospital.

Dr. N. O. Pierce, of Minneapolis, entertained at a stag party for Phi Beta Phi Fraternity on the evening of February third.

Dr. J. A. Myers, of Minneapolis, has moved his offices from 1035 Metropolitan Bank Building to 323-327 LaSalle Building.

Dr. Verne S. Cabot, of Minneapolis, is in Chicago studying with Beck Brothers, where he is doing special work in surgery.

Dr. L. J. Kennedy, of St. Paul, has recently associated himself with Dr. Bohland of Belle Plaine, and will practice medicine at that place.

Dr. and Mrs. H. S. French, of Milaca, have moved to their new home at Grove City, where Dr. French will engage in the practice of medicine.

Dr. Hugh S. Willson, of Minneapolis, expected to return to his office about the middle of February from a short vacation spent in California.

Dr. Earl H. Phillips, of Austin, has left for Des Moines, where he will serve as an interne in the Taylor Clinic at the Des Moines General Hospital.

Dr. E. T. Reeve who has been doing surgical work



at the Sievertson Clinic in Minneapolis recently returned to Elbow Lake to resume his practice there.

Dr. McRae who left Rochester in February, 1920, to enter the American Red Cross service, has returned to the Mayo Clinic to resume his work there.

Dr. W. R. Humphrey, of Stillwater, has recently moved into his new offices on North Main Street, which he is occupying with Dr. Victor C. Thompson.

Dr. W. G. Palm, announces the opening of his offices in Crookston, Minnesota, about March first, where he will limit his practice to eye, ear, nose and throat.

Dr. Walker, of Wykoff, has recently sold his practice to Dr. H. W. Christianson, of Minneapolis, and has gone to Boston to spend this year studying and doing hospital work.

The Annual Congress of the Medical Education, Licensure, Hospitals and Public Health, will be held March 7, 8, 9, and 10, 1921, in the Florentine Room, of the Congress Hotel, Chicago.

Dr. and Mrs. R. H. Sweetman, of Menahga, are spending a few weeks in California. Dr. Peter E. Peterson, of St. Paul, is taking care of Dr. Sweetman's practice while he is away.

Dr. Alexander B. Moore, roentgenologist of the Mayo Clinic, Rochester, has been named regional chairman for Minnesota for the University of Virginia Centennial Endowment fund.

Dr. W. J. Dowswell of Bellingham, has left for Milwaukee where he will spend a year taking a special course in eye, ear, nose and throat disease. Dr. E. G. Ahrens will take over Dr. Dowswell's practice.

Dr. J. E. Soper of the United States Public Health Service and Dr. Harry Ritchie, of St. Paul, were guests of the Upper Mississippi Medical Society which held its annual meeting at Brainerd recently.

Waverly, Minnesota, is without a physician since Dr. Keene left to enter army service. There is a splendid opening at this place and any one interested should communicate with the Commercial Club of Waverly.

Dr. L. A. Walker, of Asbury Hospital, announces the following appointments on the attending and consulting staff: Doctors J. F. Corbett, Paul F. Brown, J. F. Avery, A. T. Mann, J. F. Smith, Olof Kittleson and G. F. Schmidt.

Dr. C. W. Woodruff, who has practiced medicine for the past sixteen years at Chatfield, Minnesota, and for the past year has been taking a vacation, will resume his practice and has opened offices in the old postoffice building.

Dr. S. R. Maxeiner, of Minneapolis, has removed his offices from 1035 Metropolitan Bank Bldg., to 323-327 LaSalle Bldg., where he will occupy offices vacated by Dr. Gilbert J. Thomas who recently moved his office to the new Nicollet Clinic.

Dr. M. O. Opegard and Dr. O. E. Locken, formerly of Madison, Minnesota, are now connected with

the Northwestern Clinic, which was recently organized at Crookston. They have equipped an office building of twenty rooms to take care of the various departments.

Dr. Harry J. Klein, of Duluth, surgeon for the police department for the last six years, has tendered his resignation and will engage in private practice. Dr. Joseph H. Cosgrove, for a number of years associated with a physicians' clinic at Duluth, has been appointed to fill the position.

Dr. C. F. Morsman, former resident of Hibbing, and a brother of Dr. L. W. Morsman, of Hibbing, has been elected president of the Spokane Academy of Medicine, a medical society which includes only specialists in medicine. Dr. Morsman is recognized as one of the leading specialists in Washington.

Dr. James Ewing, Professor of Pathology of Cornell Medical School, will give the annual Alpha Omega Alpha address March 10th, at 8:00 p. m., in the amphitheater of the Anatomy building of the University. His subject is "The Place of Pathological Anatomy in Modern Medicine." The public is invited.

Dr. Walter Courtney of Brainerd, Minn., resigned to the Crow Wing county board as a member of the sanatorium board of the Crow Wing and Aitkin counties sanatorium at Deerwood. The commissioners offered a vote of appreciation and thanks to the doctor, and expressed the regret that the condition of his health makes it necessary for him to withdraw.

Dr. John E. Soper, for many years a prominent physician of Norwood, Minnesota, who entered the World War and served with distinction, has been appointed inspector general of hospitals for disabled former service men for the district including the states of Minnesota, North and South Dakota, Montana and Iowa. Dr. Soper has been a resident of Minneapolis since his discharge from the army.

The Division of Venereal Diseases, of the State Board of Health, wishes to announce the opening of another evening dispensary under the cooperation of Wells Memorial House and the State Board of Health. This clinic will be open Wednesday and Saturday evening at 7:30 o'clock at Wells Memorial Dispensary 116 No. 11th St., Minneapolis. During 1920 the clinics in Minneapolis, St. Paul, Duluth and Virginia, operated in conjunction with this Division of the State Board of Health, admitted 1648 cases of venereal diseases and administered 32,604 treatments.

The Clinical Club of Minneapolis held its February meeting at which Dr. Moses Barron reported a case of lead poisoning and a review of the literature. Dr. Max Scham reviewed literature on vaccination and presented numerous statistics which it would do well for all of the medical profession to have at hand to refute the usual arguments of the anti-vaccinationists. The annual election of officers took place at which Dr. E. L. Gardner was elected president to

succeed Dr. S. R. Maxeiner, retiring. Dr. Clifford Boreen was re-elected vice president. Dr. J. Warren Bell was re-elected secretary-treasurer. Dr. W. A. Fansler and Dr. Kenneth Phelps were unanimously elected as new members.

Dr. E. O. Giere of Watertown, S. D., has accepted the position of chief of staff of the St. Paul Hospital, tendered him by the directors of that institution. He succeeds Dr. E. Boeckmann of St. Paul, and will assume his new duties about May 1st, removing with his family from Watertown to St. Paul. Dr. Giere has made rapid advancement in his profession and is recognized as a leading surgeon, not only in his own state, but throughout the Central West. Commencing his work at Hayfield, Minn., he later removed to a larger field at Madison, Minn., establishing a hospital there, and thence to Watertown, S. Dak., where the hospital which he serves as chief, has developed into a large and successful institution.

(Extracts from letter of Secretary S. M. M. A.)

At the Mankato meeting of the Southern Minnesota Medical Association it was recommended that the Committee on Clinical Research consists of the following members: Dr. H. Z. Giffin, Rochester, and Drs. Walter Henry Valentine, Tracy and S. M. White, Minneapolis.

The Executive Committee says: "The Committee on Clinical Research is not to begin officially until after the next meeting, although they have been appointed and are going over the ground preparatory to beginning their work at once, after that time."

Dr. L. F. Fisher, of Thief River Falls, has received appointment as local surgeon for the Minneapolis, St. Paul and Sault Ste. Marie Railroad company.

Dr. L. M. Cruttenden, of Northfield, has gone to New York City to take a postgraduate course in aural surgery at Columbia University. He expects to be away for two or three months, after which time he will return to Northfield to resume his practice.

Dr. E. W. Benham, who has been doing post graduate work in San Francisco and Chicago for the past few weeks, has returned to Mankato, Minnesota, where he will resume his practice in the Mankato Clinic.

Dr. F. Marx White, professor of medicine at the University of Minnesota, has been appointed chief of the department of medicine by the Board of Regents, which also accepted the resignation of Dr. W. J. Mayo, as vice president of the board. Dr. Mayo, in resigning as vice president, did not sever his connection as a member. He was succeeded by M. M. Williams, of Minneapolis. Dr. White succeeds Dr. L. G. Rowntree, who has become associated with the Mayo Clinic at Rochester.

DeGraff, Minnesota, is greatly in need of a physician. This is a good locality and affords an opportunity to build up a splendid practice.

## NEW AND NON-OFFICIAL REMEDIES

During January the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

**Calco Chemical Co.:**

**Cinchophen Tablets.**

**Hynson, Westcott & Dunning:**

**Globules of Benzyl Benzoate.**

**Heyl Laboratories:**

**Acriflavine.**

**Proflavine.**

**Intra Products Co.:**

**Calcium Cacodylate—IPCO.**

**Winthrop Chemical Co.:**

**Salophen.**

**Morgenstern & Co.:**

**Salophen.**

**Neocinchophen.**—The ethyl ester of methyl-phenyl-nicotinolin-carboxylic acid. It was first introduced as novatophan. The actions and uses of neocinchophen are the same as those of cinchophen (New and Non-official Remedies, 1920, p. 224), only it is tasteless.

**Tolysin.**—A brand of neocinchophen complying with the N. N. R. standards. It is supplied in the form of a powder and as tolysin tablets 5 grains. Calco Chemical Co., Bound Brook, N. J.

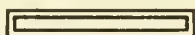
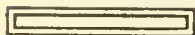
**Saligenin.**—**Salicyl Alcohol.**—Saligenin is a local anesthetic, similar in action to procaine. It is said to be as effective as procaine but much less toxic; also the anesthesia produced lasts longer, and for this reason the addition of epinephrin is not necessary. Saligenin is a white solid soluble in water.

**Salicaine.**—A brand of saligenin complying with the N. N. R. standards. Calco Chemical Co., Bound Brook, N. J. (Jour. A. M. A., Jan. 8, 1921, p. 113).

**Pneumococcus Vaccine No. 14—Beebe.**—A pneumococcus vaccine (see New and Non-official Remedies, 1920, p. 285) containing Types I, II, III and IV diplococci pneumoniae in equal proportions, suspended in physiological solution of sodium chloride, each Cc. containing 500 million killed bacteria. Marketed in vials of 6 Cc., 10 Cc., and 20 Cc. Beebe Laboratories, Inc., St. Paul, Minn.

**Typhoid-Paratyphoid Vaccine No. 39—Beebe.**—A typhoid vaccine (see New and Non-official Remedies, 1920, p. 291) marketed in packages of three 1 Cc. vials, each Cc. containing 1,000 million killed typhoid bacilli, 500 million each of killed paratyphoid bacilli A and killed paratyphoid bacilli B, suspended in physiological solution of sodium chloride; also marketed in 30 Cc. vials. Beebe Laboratories, Inc., St. Paul, Minn.

**Colon Vaccine (Acne) No. 11—Beebe.**—A colon bacillus vaccine (see New and Non-official Remedies, 1920, p. 282) marketed in packages of six 1 Cc. vials, each Cc. containing 1,000 million killed colon communis bacteria suspended in physiological solution





of sodium chloride; also marketed in packages of one 10 Cc. vials and in packages of one 20 Cc. vials. Beebe Laboratories, Inc., St. Paul, Minn.

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

F. J. HIRSCHBOECK,  
FIDELITY BLDG., DULUTH.

THOMAS A. PEPPARD  
LA SALLE BLDG., MINNEAPOLIS

**THE USE OF A HIGH FAT DIET IN THE TREATMENT OF DIABETES MELLITUS:** L. H. Newburgh and Thurlow L. Marsh (Arch. of Int. Med., Dec., 1920). The authors state that the high protein, low fat, low carbohydrate diet, as usually given in diabetics according to the Allen regime, if given in sufficient quantities to maintain the needs of the body, shows an accompaniment of glycosuria in the severe cases of diabetes. In order to prevent this the caloric intake must be reduced so that inanition results, as an increase in the fat elements would immediately induce an acidosis. The physician is left with the alternative then of either having the glycosuria persist or have the patient suffer from inanition, due to the low caloric intake. The authors endeavor to solve this dilemma by revolutionizing the present conception of the treatment, by permitting a liberal fat diet, adding only enough proteid to maintain the nitrogen equilibrium, and a minimal amount of carbohydrates. They have adopted a more or less routine procedure as follows:

When the patient enters the clinic he is at once given 900 to 1000 calories, of which about 90 grams is fat, 10 grams protein, and 14 grams carbohydrates. After the patient has been sugar free for one or two weeks his diet is increased to about 1400 calories, of which 140 grams is fat, 28 protein, and 15 or 20 grams carbohydrates. With a larger person, a second increase is subsequently made after another period of trial, so that they are given 1800 calories, with 170 grams of fat, 30 to 40 grams of protein, and 25 to 30 grams of carbohydrates.

They have studied the effects of this treatment on 72 cases of true diabetes mellitus, with no selection of cases, the majority, however, being of the severest type. In spite of this latter fact, however, they have succeeded in rendering and keeping every patient sugar free up to the time of discharge.

They report 3 severe cases, in which the patients became promptly sugar free with the institution of their diet of 900 to 1000 calories, but who became promptly glycosuric again after the resumption of the high protein diet, later on again becoming sugar free by returning to their original diet. They add

further that in no case did a serious acidosis develop.

Four of the 72 patients died in the hospital, but none of their deaths were due to their diet, they claim. One entered with Influenzal pneumonia; another was transferred from the surgical clinic, suffering from a severe sepsis accompanying mastoid disease; both patients dying within 24 hours after admittance. The third patient came to the hospital in coma and died ten days later. The fourth patient refused to limit herself to the diet, and went into coma after eating a bag of oranges.

Four examples are given of cases in which the acidosis promptly improved with their treatment, when it was present on entrance.

As a support to their belief that the protein intake can be considerably reduced, they cite the observation of Hindhede that less than .66 grams of protein per kilogram of body weight is required to maintain the nitrogen balance in healthy individuals, in the presence of sufficient calories from other sources. The diet of the authors is based on this observation. They realize that this may not be true in diabetics, however, and they have computed the ratio between the nitrogen intake and output by the usual procedures. They find that Hindhede's rule holds good in diabetics as well as in normal people.

Lastly, they show that the strength and capacity for work of the patient is astonishing, which they claim tends to prove that their diet is satisfactory in enabling their patients to lead an active life for an indefinite period.

In this first paper, which concludes with an appendix of diabetic diets as used by the authors, they claim that their treatment fulfills the four requirements of a satisfactory diet, namely, the prevention of acidosis, the maintenance of the nitrogen equilibrium, the absence of sugar, and finally, making it possible for the individual to resume the ordinary activities of life.

F. J. HIRSCHBOECK.

**FIRST INFECTION WITH TUBERCULOSIS BY WAY OF THE INTESTINAL TRACT:** Eugene L. Opie (Amer. Rev. of Tub., Vol. 4, No. 9, page 641). Autopsies made upon 93 children and 50 adults in the city of St. Louis showed no case of healed mesenteric tuberculosis. Among British soldiers in France, however, caseous or calcified mesenteric nodules were found in 18 instances among 66 autopsies. In 15 other autopsies on British soldiers the proportion of mesenteric tuberculosis was approximately the same. The greater frequency of tuberculosis among cattle in Great Britain is suggested as an explanation for the numerous cases of mesenteric tuberculosis.

Focal tuberculosis of the lungs was not found in a single autopsy that showed mesenteric tuberculosis. In two instances, however, healed apical tuberculosis occurred and in one there had been active widespread tuberculosis of the lymphatic system. Opie points out that the available evidence indicates that the first infection with tuberculosis does not uniformly

prevent a second infection but modifies its course so that it tends to become chronic and exhibits little tendency to become disseminated. He also states that first infection with tuberculosis may occur by way of the lungs or by way of the gastro-intestinal tract; and the occurrence of one lesion tends to prevent the other.

J. A. MYERS.

**THE EFFECT OF ARTIFICIAL PNEUMOTHORAX ON PULMONARY TUBERCULOSIS IN THE RABBIT:** H. J. Corpe, Saling Simon, O. B. Rensch (The Amer. Rev. of Tub., Oct., 1920). Although artificial pneumothorax is a thoroughly established therapeutic measure, study of it in connection with experimental tuberculosis has been neglected.

The effect of compressing a diseased lung is generally accepted as being inhibitory to the tuberculous process. The increased fibrous tissue formation is best explained as resulting from the lymph stasis.

The question of the circulation in the compressed lung interested the authors, not only because of the paucity of literature but also because of the diversity of opinion and results from the few experiments which have been done. The conclusions drawn by Shaw in 1919 was the particular stimulant to the authors' research because he found that after intravenous injection of tubercle bacilli into the rabbit, the collapsed lung was found to be tuberculous when other organs were normal. Such observations, if true, would contra indicate pneumothorax especially in early cases and probably in all.

Rabbits were used in the experiments described. Intravenous injection of a uniform suspension of virulent human tubercle bacilli was done after a one side pneumothorax or hydrothorax had been performed. Controls were used, no compression being produced in them. The animals were killed 10, 19, 28 and 37 days after infection. They showed no difference in number or type between the tuberculous lesions in the collapsed and normal lungs. The result differs from that of Shaw who concluded that compression favors the development of tuberculosis in the compressed lung. In animals which were given suspensions of Prussian Blue, Scarlet R and starch, intravenously, the collapsed lungs showed a distribution of the dyes equal to the normal lungs. The gradual disappearance of the Prussian blue occurred uniformly on both sides which showed that the circulation was neither lessened nor improved in the collapsed lung.

EVERETT K. GEER.

**PULMONARY FINDINGS DUE TO CIRCULATORY CHANGES:** J. S. Prithard and M. A. Montensen (Amer. Rev. of Tub., Oct., 1920). The authors point out that diagnosis of pulmonary tuberculosis is sometimes made and the patient subjected to an anti-tuberculosis regimen over a long period of time when no clinical tuberculosis exists, but the physical signs and clinical symptoms are due to a disturbance of the circulatory system. For example, fibrotic

changes in the lungs may accompany mitral stenosis and in such cases hemoptysis not infrequently leads to confusion in differentiating between circulatory deficiency and pulmonary tuberculosis.

Infarction of the lungs may cause such extensive pulmonary changes that the condition is confused with pneumonia. Again in some cases of extreme cardiac enlargement or pericardial effusion expiratory sounds, bronchial in character, due to the underlying compressed lung tissue may be heard over the back of the left base thus making it difficult to differentiate between pericardial or pleural effusion and pneumonia.

Bronchitis not infrequently accompanies cardiac lesions and when one is in doubt as to its etiology the administration of digitalis often causes marked improvement thus indicating that the circulatory deficiency is at least an associated factor in causing the symptoms. In many cases with bronchial symptoms such as are present in protracted colds, circulatory degeneration should be considered as a possible causative factor as well as upper respiratory affections and pulmonary tuberculosis.

From the above facts the authors conclude that all pulmonary signs and symptoms must be very carefully studied from the etiological point of view and that physical signs in the lungs should not be the only basis in making a diagnosis.

J. A. MYERS.

**TUBERCULOSE PULMONAIRE ET CANCER PRIMITIF DU POU MON:** (Pulmonary tuberculosis and primary cancer of the lung) Maurice Letulle (Presse Med., August 7, 1920). The author reports two cases of combined pulmonary tuberculosis and primary carcinoma of the lung. In both cases cancer developed in the presence of active tuberculosis.

The first patient entered the hospital for advanced tuberculosis. Physical signs revealed abscesses at the right upper lobe and the patient was coughing up profuse purulent sputum containing acid fast bacilli. The tuberculous infection was not unusual, but the patient complained of excessive pain in the right side. During the course of the disease rather unusual symptoms developed. There was edema of the face; the veins of the chest, upper thorax, and right arm became distended. A diagnosis was made of obstruction to the superior vena cava. Autopsy findings showed the superior lobe of the right lung a cancerous mass containing many small tuberculous cavities which were almost obliterated by the cancerous ingrowth. Microscopic examination of the lung tissue showed epithelioma. The right pleura and mediastinal and cervical glands showed cancerous involvement and the superior vena cava was compressed by a mass of fibrous malignancy.

The second case was diagnosed at necropsy. The lung was filled by a caseating mass containing giant cells. Foci of definite malignancy were found in the bronchi. The alveolar spaces were also filled with large deeply stained cells containing prominent nuclei, many of which showed active cell division.



Cancer secondary to old tuberculosis is perhaps not rare. The epithelium of the bronchi and alveolar spaces can undergo cell division and become malignant in the same way that the other tissues in the body undergo malignant changes. Letulle states that his two cases with the combination of primary cancer and tuberculosis is a much rarer condition than the association of a metastatic cancer and tuberculosis. Metastasis to the lung and pleura, either by emboli or by direct extension is quite common.

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## SURGERY

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**REPORT ON TETANUS:** A. P. C. Ashhurst (Arch. Surg., 1920, 407 to 428). Tetanus is a pure toxemia; the bacilli or their spores may remain in the tissues without producing symptoms, if toxin is not formed. Not all strains of the tetanus bacilli produce toxin and it must be remembered that symbiosis of the spores of the bacilli with other organisms is necessary to produce toxin.

The toxin ascends the peripheral nerves to the spinal cord by way of the axis cylinders and the lymph channels of the epineurium and perineurium. Robertson's experiments have further shown that the toxin reaches the spinal cord by way of the motor roots. Tetanus dolorosus may be caused experimentally by injecting toxin into the sensory nerve roots; the animals will die of exhaustion before motor phenomena appear. Experimental tetanus in the small laboratory animals is usually of the ascending type in which the symptoms appear first in the inoculated extremity. In the larger animals and in man the descending type is the rule; the characteristic spasm develops first in the muscles of the jaw and neck no matter where the site of injection. This is explained by the rapid absorption of the toxin into the general circulation. The toxin in the spinal cord stimulates the motor cells and makes the sensory system more susceptible to external stimuli. Tonic and clonic spasms of the muscles are then produced.

The treatment of tetanus may be divided into prophylactic and active. The most important factor in prophylactic treatment is thorough mechanical and chemical cleansing of all wounds. Anti-tetanic serum should be given routinely to patients with contused and lacerated wounds which have been exposed to contamination. The results of the prophylaxis have been demonstrated during the recent war, as the mortality from tetanus in the A. E. F. was less than 2 per 100,000. The usual prophylactic dose of 1500 units may be given subcutaneously or, preferably, intramuscularly, as soon as possible after

the injury; it should be repeated at intervals of eight to ten days until the wound is clean and granulating. The author also emphasizes the importance of giving serum before late operations on the injured areas. It is understood that active surgical care of the wound itself is not to be neglected.

The active treatment of tetanus has for its aim (1) removal of the source of the toxin, (2) neutralization of the toxin already formed, (3) depression of the function of the cord, and (4) careful nursing. The serum may be given subcutaneously, intravenously, or intraspinally. The subcutaneous method is the least satisfactory, because of the large amount of serum necessary to produce the desired effect. The injection should be given early and as nearly as possible in a single massive dose; moderate doses should be repeated until the symptoms begin to subside. Bromides and chloral have been found the most useful drugs to depress the spinal cord and control the convulsions.

The author reports 18 cases of tetanus with a mortality of 35.8 per cent following unsatisfactory treatment. Of 13 remaining patients to whom he was able to give early and efficient treatment, two died, or 15.3 per cent.

J. I. MITCHELL.

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### SURGICAL ASPECT OF CHARCOT JOINT AND OTHER SYPHILITIC BONE AND JOINT LESIONS:

F. J. Cotton (Ann. Surg., 1920, 72, 488-493). The author reports ten cases of syphilitic bone and joint lesions and believes much benefit may be derived from efficient fixation and orthopedic measures, combined with intensive anti-syphilitic treatment.

Six of the patients were tabetic with Charcot joints of the knee, wrist, ankle, thumb, and great toe, and showed definite improvement under treatment; two of these were classed as transitional in type, and two as syphilis of the bone.

The four remaining cases showed retrogression of symptoms and repair of soft tissues, but no regeneration of bone was detectable by the x-ray. Joint changes are arrested by treatment and bone repair instituted. Charcot joints have been considered incurable. Although they may not be completely curable, restoration to safe use is possible. No spirochaetae were found in the joint fluid, but in spite of this Cotton believes the lesions specific.

The treatment described by the author produces a prompt effect on the joint. The destruction is checked and bone is regenerated. The joint capsule shrinks and tightens. The excess of soft tissue and waste fluid is absorbed.

Two cases were operated on and the wound healed perfectly. From this it is thought that they may be made safe for ankylosing.

J. I. MITCHELL.

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**TWELVE CASES OF THROMBOSIS OF THE CAVERNOUS SINUS:** J. Julian Chisolm and S. Shelton (Archives of Surgery, Nov., 1920, P. 482). The rarity of the appearance of thrombosis of the cavernous sinus warrants a careful study of the

cases reported in the literature for a thorough understanding of the condition. Chisolm and Shelton record in full 12 cases, 8 of which were gleaned from the surgical records of 50,000 cases appearing at the Johns Hopkins Hospital during the past 20 years.

**Etiology:** The most common causes for thrombosis of the cavernous sinus are trauma, marasms and infection. Marasmic thrombosis arises from debilitating conditions either in the young or the old and is never primary, appearing secondary to a longitudinal or lateral sinus thrombosis.

In traumatic thrombosis the cavernous sinus becomes involved through fractures of the base of the skull, direct injury of the sinus, wounds through the orbit or during operations on the Gasserian ganglion.

Septic thrombosis, by far the most common form almost always arises secondary to a thrombosis of some of the efferent or afferent veins. It may arise primary to a basilar meningitis, abscess of the post-orbital space, suppurative sphenoiditis or cares of the petrous portion of the temporal bone.

The bacteria most often reported are staphylococcus albus, staphylococcus aureus, streptococcus pyogenes and the pneumococcus and diplococcus intracellularis.

**Pathology:** Marasmic thrombi are sterile; as a rule the same is true of traumatic and operative cases. Septic thrombi as elsewhere begin with phlebitis. At first the thrombus is red and fragile, adherent to its walls and nearly always fills the lumen. It may become purulent. The wall of the vessel is thickened and lusterless and often perforated. Usually there is involvement of other sinuses with both cavernous sinuses implicated. Often there is present a basilar meningitis of a purulent nature complicating the condition. Other complications are meningeal hemorrhages, a serious meningitis of Quinke, brain abscess, emboli of the lungs and other parts of the body, infarction of the lungs, liver, spleen, and kidneys. Usually there is more or less infection of the neighboring vessels and nerves, frequently necrosis of the sphenoid and the petrous portion of the temporal bone.

**Symptoms:** The history of a chill, severe headache, septic temperature and exophthalmos always beginning on one side but involving the other in from 24 to 48 hours immediately calls to mind thrombosis of the cavernous sinus as the most likely diagnosis. The temperature is usually septic in character. The primary infection may be slight e. g. a small furuncle of the face, infected hair follicle in the vestibule of the nose, etc. With the involvement of but one eye conditions that may simulate thrombosis of the cavernous sinus are erysipelas, cellulitis of the orbit secondary to accessory sinus disease, tumors of the orbit, and arteriovenous fistula of the internal carotid artery, also tenonitis and thrombophlebitis of the ophthalmic veins.

**Treatment:** Many prefer to treat the symptoms as they arise, others advocate prompt and radical opera-

tions on the cavernous sinus. Statistics show that but 7% recover without operation. It should be added that with operation less than 7% recover. The various operations advocated for the relief of thrombosis of the cavernous sinus are the temporal route of Dwight and Hartley, the orbital route of Mosher, the ethmosphenoidal route of Langwoethy and the Luc operation through the antrum of the opposite side.

PAUL D. BEMSFORD.

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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ALBERT G. SCHULZE,  
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**PUERPERAL SEPSIS AND ITS TREATMENT:** R. S. Titus (Boston Med. and Surg. Jour., Sept. 23, 1920). This subject, which should be of interest to all readers, is so thoroughly and convincingly presented that it might be of value to present the author's conclusions which are as follows:

"Puerperal infection is bacterial infection. Organisms gain entrance, first by vaginal examination; second, by the presence of an abnormal vaginal flora at the time of labor; third, by extension from foci of infection elsewhere in the body. The three types of puerperal infection depending upon the organism are, first, hemolytic streptococcal infection; second, pyogenic infection; third, saprophytic infection. The treatment of each type depends upon the bacterial reaction and the knowledge of its pathology. By and large leave it alone. The curette is dangerous. The antiseptic douche unintelligent. The conservative treatment rational and harmless. Surgery plays its part only when the infection has produced localized pus, and then the oldtime surgical principle of the evacuation of pus obtains. Vaccines and serums have had their try and have been found wanting. The future holds its hope first in aseptic preparation of the patient, second, absolute cleanliness of the operator. In this way to lower the percentage of infection to its lowest possible point. Next, conservative treatment, to do no harm rather to go on the supposition that some good may come from interference and in the specific serum for each individual case based upon the success of the treatment of type four in pneumonia. Theoretically, vaginal smears and cultures of a pregnant woman taken soon before labor may point out those which contain harmful bacteria and in consequence, some method of making these harmful bacteria harmless may be evolved."

ALBERT G. SCHULZE.

**A DEMONSTRATION OF CERTAIN TRANSITION STAGES FROM BENIGN TO MALIGNANT CONDITIONS IN THE OVARY, UTERUS AND VULVA:** Thomas Watts Eden (Am. Jour. of Ob. and Gyn., Vol. 1, No. 1). 1. Such changes are gradual and it is



difficult to describe a definite precancerous stage. 2. In the ovary, cancer occurs usually in cysts and not in unaltered organs. Therefore, observance of the accepted rule of removal of all ovarian neoplasms is safe. 3. From the fundus of the uterus, he shows a typical histological picture of irregular proliferation of the epithelium in gland tubules, which is regarded as precancerous, and indication for hysterectomy. 4. Erosions of the cervix may heal spontaneously or as a result of treatment by a replacement of the columnar epithelium and glands, by squamous cells. On the other hand, erosions accompanied by deep lacerations with round cell infiltration may become cancerous. This type of lesion should be freely excised, though hysterectomy is not indicated. In nulliparous women erosions remain more benign. 5. Cervical adenomatous polyps do not represent a precancerous state, but the rule of excision is a good one. 6. Chronic vulvitis is not necessarily precancerous, though leucoplacia may be so regarded, also vulvitis accompanying glycosuria.

The new "American Journal of Obstetrics and Gynecology" is of great promise to all physicians who are interested in these branches of medicine. The American Gynecological Society, The American Association of Obstetricians and Gynecologists, and the Obstetrical Societies of New York, Philadelphia, and Brooklyn, are represented in this publication. This fact together with the personnel of the editorial board, guarantees an abundance of highgrade material. The reader may be assured that here will be found not only the best, but all of the substantial contributions in these subjects. Certainly, Volume 1. Number 1. is a worthy example and the list of accepted articles is a splendid indication for the future.

ARCHIBALD L. McDONALD.

**FURTHER OBSERVATIONS ON THE FUNCTION OF THE CORPUS LUTEUM:** E. H. Ochsner (Surg. Gyn. and OB., Vol. 31, No. 5). Dr. Ochsner considers some important relations of the corpus luteum to sterility, pregnancy abortion, and intra-abdominal hemorrhage; based on the experience of veterinary surgeons with cows, and on his own clinical records. 1. The presence of an unabsorbed false corpus luteum prevents "heat" in cows, and therefore the possibility of pregnancy. Uterine or periuterine infection delays such absorption and renders the animal sterile. This may be overcome by; (a) clearing up the local infection, or (b) removal of the unabsorbed corpus luteum. A number of clinical cases are cited which amplify the truth of this statement as regards the human. 2. Regardless of the date of the last menstruation, all women menstruate within 36 hours after surgical removal of an unabsorbed false corpus luteum. 3. The corpus luteum in the cow is not absorbed during suckling, hence "heat", and the possibility of pregnancy is not re-established. This period may be cut short by expression of the corpus luteum. This observation may explain the period of postpartum amenorrhoea and sterility in the human. 4.

Injury to the true corpus luteum causes abortion in a large number of instances. This is more important than any other factor in laparotomy during pregnancy. 5. Rupture of an atypical corpus luteum may cause pelvic hemorrhage and uterine bleeding, simulating extra-uterine pregnancy.

ARCHIBALD L. McDONALD.

## PEDIATRICS

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**NERVOUS AND UNSTABLE CHILDREN:** E. Bosworth McCready (Arch. of Ped., Oct., 1919). The well poised, effective, emotionally stable adult human being is the exception rather than the rule in modern life. The neuroses and psychoses are not of sudden onset in but few instances do they develop in a previously sound individual. Some children are born nervous (hereditary causes); some acquire nervousness (disease, habits, etc.); others have nervousness thrust upon them (faulty training at home and at school, and by other social causes). To counteract and to remove these causes in their various phases, is, the duty and privilege of the physician.

The proper development of the nervous system is dependent upon proper metabolic functioning. Anything that interferes with this as, improper food, insufficient food, acute or chronic disease, fatigue, physical and emotional causes, lays the foundation for future trouble. In fact so closely associated and interrelated are the symptoms of deficient growth, energy and nervous insufficiency that the mutual and reciprocal action of each is apparent.

Treatment should begin as early in life as possible, employing every means to allow mature every opportunity for beneficent activity. Unfortunately the average private home, is conducted for the convenience of the adult members of the household, and the children may fit in as best they can, just so they keep out of the way of their elders. Thus the treatment of the nervous child must begin with a modification of the immediate environment. Again, no matter how solicitous and conscientious the parents may be, they lack the special training and experience which would enable them to deal effectively with a mal-adjusted child. The first consideration should be to see that the child obtains sufficient rest. Most children are over-stimulated by the conditions of modern life. Fatigue in children brings about a nervous irritability which leads to further effort, giving the impression that the child is unusually energetic. Equalling the importance of the prevention of over-fatigue is the regulation of the diet. The school child, in the habit of sleeping until the last minute, comes to the table with time only to bolt one or an-

other emasculated and widely exploited cereal whose only virtue is that it requires a large quantity of cream to be swallowed.

Fresh air, bathing, regulated exercise, all have an important place in the hygienic management of the nervous child. To the urban realist "pigs is pigs," but to the up-to-date farmer good pigs and other animals are balanced rations, exercise and fresh air. Our domestic animals are important and valuable, but are they more important and valuable than our children?

The Standard Dictionary states: "It (education) includes not only the narrow conception of instructions to which it was formerly limited, but embraces all forms of human experience, owing to the recognition of the fact that every stimulus with its corresponding reaction has a definite effect upon character."

ROY N. ANDREWS.

**CYANOSIS IN THE NEW BORN:** Frank Cohen, (Arch. of Ped., Nov., 1920) discusses cyanosis in the new born as an entity in itself and classifies around it the conditions under which it occurs. He describes cyanosis as "a condition of increased oxygen unsaturation in the peripheral capillaries." Oxygen unsaturation he defines as "the difference between the oxygen in the venous blood and the total amount of available oxygen in the blood."

Cyanosis occurs in the new born because of (1)

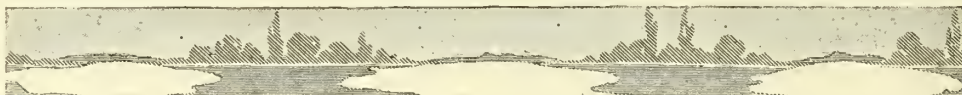
the character of labor, (2) an abnormal developmental process, or (3) sepsis.

1. Asphyxia neonatorum is followed by cyanosis, as in cases of prolonged labor, cord about the neck, premature separation of the placenta, placenta previa, prolonged anesthesia, the asphyxia of the new born of twilight sleep, or that following pituitrin, and in intracranial or cerebral hemorrhage. In all but hemorrhage the cyanosis passes away with the proper treatment of the asphyxia.

2. Cyanosis is present in cases of abnormal development as pulmonary atelectasis, congenital heart defects, thymus hyperplasia, diaphragmatic hernia and other anomalies. In congenital heart defects cyanosis may be the only apparent sign, or if combined with the presence of a murmur will point very strongly to a cardiac defect. The extreme grades of cyanosis appear in pulmonary obstruction, in cases of pulmonary stenosis or atresia, and in the transposition of great vessels. With thymus enlargement, the cyanosis may be intermittent, or continuous, and may be accompanied by inspiratory stridor, or convulsions. In cases of diaphragmatic hernia there is an extreme grade of cyanosis and dyspnea with signs of cardiac displacement, absence of murmurs, and absence of pulmonary resonance on one side.

3. Cyanosis may be a prominent symptom in infectious cases such as peritonitis, pneumonia, arthritis, osteomyelitis, septic conditions following cord infections and the like.

N. O. PEARCE.



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# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### REGIONAL ANESTHESIA IN SURGERY OF THE HEAD\*

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Local infiltration is a well-known procedure consisting in the free and liberal distribution of an anesthetic solution in the subcutaneous tissues, as well as in the deeper layers, and its characteristic feature is that the site of injection lies along the line of incision. Sometimes the skin is first anesthetized and incised, and supplementary injections made in the fascia through the surgical wound. Occasionally this technic has been found objectionable, especially in cases of infected wounds or areas, and there is now a general tendency to replace it by circumferential infiltration; that is, the subcutaneous distribution of the solution along straight lines which are the sides of a geometric figure, one of the diagonals of which is the line of the proposed incision. Injections are also carried deep in planes passing through those sides, so as to erect walls of anesthesia encircling the operative field. This is called "field blocking" and is the first step toward nerve blocking.

The principal reasons for the adoption of field blocking are: (1) absence of distortion of the anatomic features along the line of incision; (2) anemia of the tissues within the blocked area, due to the vasoconstrictive effects of epinephrin contained in the novocain solution; and (3) muscular relaxation with greater facility for the use of contractors. The principal objection to direct local infiltration is the frequent occurrence of defective healing of the surgical wound.

The advantages of regional anesthesia are

most apparent in operations on the head because the anatomy of the head is so peculiar, compared with that of the rest of the body, its sensory nerve supply is so remarkably simple, and its vascular system so decidedly rich; for the same reasons the disadvantages of general anesthesia are here most self-evident.

The sensory innervation of the head is chiefly due to the trigeminus. The cervical nerves supply the scalp backward and laterally as far as the vertex. All the nerves distributed to the frontal, temporal, and occipital regions become subfascial on a line encircling the head, drawn above the ear and passing through the occiput and the glabella. They emerge from the fascia, become subcutaneous, and converge toward the vertex where some of the branches anastomose. It is therefore very easy to insensitize any portion of the scalp by making subcutaneous injections; and this procedure not only anesthetizes the skin, but gives anesthesia to the fascia, periosteum, and bone of the crown of the head. The first branch of the trigeminus is not accessible. The various branches of the ophthalmic nerve may be blocked in the orbit or as they emerge from that cavity. The second branch, or superior maxillary, may be blocked at its exit from the foramen rotundum, either through the orbit or laterally from two sites of puncture, the first, on the lower border of the zygoma through the sigmoid notch of the ascending ramus, and the second, above the zygomatic process of the malar bone. The infra-orbital nerve is reached at the infra-orbital foramen. The third branch or inferior maxillary is injected at the foramen ovale, with a technic similar to that used for the superior maxillary, but instead of passing anteriorly to the pterygoid process into the sphenomaxillary fossa, the needle is advanced posteriorly toward the foramen ovale. The inferior dental and lingual nerves are very easily reached on the medical aspect of the ascending ramus near the dental foramen. The

\*Presented before the staff of the Mayo Clinic and the Faculty and Fellows of The Mayo Foundation, Rochester, Minn., October 12, 1920.

mental nerves are usually blocked at the mental foramen.<sup>1, 2, 6, 7</sup>

Regional anesthesia has its most brilliant applications in the surgery of the head, and the study of nerve blocking at the base of the skull is most attractive. Field blocking is an easy routine procedure in operating on the scalp, cranium, and brain, especially on the vertex; but blocking the branches of the trigemini for extensive operations on the face requires special training with a hat pin on both skeleton and cadaver. Once the study of the passage of the great nerve trunks through that labyrinth of foramina, canals, and fissures has been mastered, the operative difficulties on the living are overcome with a little patience, care, and method. There are accurate and reliable procedures for reaching the great nerve trunks by deep injections, especially the branches of the fifth nerve at their points of emergence from the various foramina, the study of which carries with it a wealth of information common to physicians and surgeons.

Neuralgias are sometimes relieved by extra-neural novocain infiltrations or by alcohol injections into the nerve trunks, and nearly all operations on the head and within the cranial cavity are within the scope of regional anesthesia.

In dental<sup>5</sup> and ophthalmic surgery nerve blocking is the method of choice.<sup>4</sup> In superficial and minor operations, such as excision of sebaceous cysts, and suture of the scalp, infiltration around the operative field is always successful. The needle is inserted through two or more anesthetic intradermal wheals previously infiltrated with the fine needle, and the solution spread into the soft tissues along the line joining two of the wheals. The different wheals are joined in such a way as to block the operative field at the center of which lies the intended line of incision, or the wound. When extensive lateral sutures of the scalp are proposed, a line of infiltration is drawn just above the zygomatic arch and produced both ways to meet the glabella and the occiput, passing above the superior margin of the orbit and above the ear. In certain cases it is necessary to connect the extremities of this semi-oval by a sagittal infiltration so as to control the nerves overlapping from the opposite side. Along and above the zygoma, deep injec-

tions down to the bone should be made so as to reach the temporal nerves.<sup>3, 5</sup>

If the injections are carried within the superficial fascia and under the epicranium, craniectomies are painless. Malignant growths involving the dura may be extirpated by this same simple method. The dura is insensitive and so is the brain in the usual operative areas. Regional anesthesia thus finds its indications in depressed fractures and for evacuation of epidural or subdural hemorrhage or of intracranial abscesses. Osteoplastic flaps may be raised with a view to operating on the cortex of the brain. Subtemporal decompression may be performed and tumors of the cerebellum successfully dealt with.

The regional method has the advantage of avoiding the edema of the brain which results from the use of general anesthesia. Ether congests the brain and causes considerable bleeding of the diploe, necessitating the use of Horsley's bone wax. The oozing of the very small vessels and the danger of postoperative hemorrhage are factors that need consideration. The epinephrin contained in the novocain solution used in all these cases acts as a hemostatic and it is hardly necessary to clamp any except the larger blood vessels. For operating under regional anesthesia, all bone instruments should be sharp so as to avoid or rather lessen the unpleasant shock as much as possible; undue hammering should be avoided.

All minor and superficial operations on the soft tissues of the face are usually performed with field blocking. If the skin only is to be removed infiltrations are made in the subcutaneous tissue, but attention must be called to the fact that in certain parts of the face where the nerves emerging from their foramina lie in the middle of the operative area, superficial anesthesia can only be obtained by blocking the nerves at their exits, that is, the mental and infra-orbital regions. The lower lip may be anesthetized by blocking the two mental nerves either from outside or through the mouth and carrying the injection beneath the skin and mucous membrane obliquely outward as far as the angle of the mouth. We should not forget that the cervical nerves sometimes overlap the lower border of the lower jaw and that infiltration along that border is often a necessity. For the upper lip, it is preferable to inject both infra-orbital



nerves, and it is sometimes convenient to make a deep injection below the septum of the nose.

Many surgeons abstain from using regional anesthesia for such mutilating operations as the extirpation of the tongue or resection of the maxilla, owing to the severe psychic effect on the unfortunate conscious patient, even the most stoical.<sup>1</sup> The technic of regional anesthesia is suitable, however, for any partial or total resection of the tongue or of the maxilla and if the great difficulty of administering general anesthesia in these cases is taken into account and the fact that the patient is always aspirating blood, it should not be considered a too severe trial for the patient to be conscious of the operation. In certain cases, intratracheal anesthesia may be carried on by some special device, either through the nostrils or tracheal wound, tracheotomy having been performed previously with a view to general anesthesia by long tubing from an ether regulator worked at a distance by some clever anesthetist and controlled by the surgeon; but I would rather convince the patient of the difficulties attending such operations under general anesthesia, give him some scopolamin morphin as preliminary psychic treatment and proceed with regional anesthesia.

In case of partial resection, if the growth is situated at or near the tip of the tongue, a wall of anesthesia involving its entire thickness is raised across the organ at a little distance from the lesion; if the lesion lies on the side of the tongue, the injections should be made in two planes at right angles to each other, one of them being parallel with the long axis of the tongue, thus anesthetizing the quadrant bearing the growth. Total resections may be made by (1) blocking the dental and lingual nerves on the side of the ascending ramus, (2) injecting the cervical plexus, (3) infiltrating the base of the tongue so as to block the glossopharyngeal, and (4) blocking the superior laryngeal. If a cross incision of the cheek from the angle of the mouth is needed, infiltration should be made involving its thickness along a line drawn from the malar bone to the lower jaw at the level of the second molar teeth.

Tonsils are operated on by infiltrating the anterior pillar and the tissue situated laterally and behind from two puncture points towards the poles of the tonsil.

Regional anesthesia in ophthalmology has been greatly developed in the last years, and it is chiefly to Duverger, Professor at Strassbourg, that we owe our clinical knowledge of local anesthesia in ophthalmologic surgery. Cocain in 10 per cent solution gives a good superficial anesthesia, but novocain-epinephrin solutions are the best when deep injections are resorted to. The strength varied from 2 to 5 per cent and the quantities injected depend on the skill and experience of the anesthetist.

The intra-orbital and retro-orbital nerve trunks may be approached through the orbit, using the smooth bony surfaces and fissures as land marks and guides, care being exercised always to keep the point of the needle in close contact with the bone, thus keeping away from the axis of the orbit which is the dangerous zone. But in extensive operations such as enucleation, the apex of the muscular cone of the eyeball is infiltrated intentionally. Two sites of puncture are usually adopted; the first, a little above the external angle of the palpebral fissure, is meant for the blocking of the frontal and lacrimal nerves; the second, a little above the internal palpebral fissures in the puncture point toward the nasal nerve.

If subcutaneous injections are made on each side of the ear from two points, one above and one below, and carried down to the deep fascia attached to the bone, the external ear may be anesthetized. When the auditory canal is involved a deep injection should be made at the root of the ear on its posterior aspect in order to catch the auricular branch of the vagus.

The entire region of the mastoid may also be anesthetized by subcutaneous and deep injections carried down to the bone. A speculum is then inserted into the ear and injections made into the superior wall of the auditory canal, at the junction of the bony and cartilaginous parts. Similar injections are made in the other walls of the canal. A small pledget of cotton moistened with 10 per cent cocain solution is then inserted into the tympanic cavity.<sup>2</sup>

In cases of severe trauma of the skull, the patients are very often in a state of unconsciousness which permits painless operations on the base of the skull by means of regional anesthesia alone; some of them, however, are restless and general anesthesia seems preferable. For the

resection of the posterior root of the fifth nerve in the treatment of trifacial neuralgia, as well as for any other extensive intervention involving the base of the skull, it is advisable to use rectal oil ether anesthesia combined with regional anesthesia to control the mental excitement of the patient who, under ordinary conditions, would not stand such a severe trial. This to our mind is a much simpler and safer method than inhalation narcosis, unless the surgeon is specially equipped for such operations and a specially trained anesthetist is available.

Fresh novocain-epinephrin solutions are the best. We make our solutions by dissolving sterile novocain powder in sterile normal salt solution (0.9 gm. of sodium chlorid for each 100 c. c. of double distilled water) and adding to every ounce of the novocain solution five drops of epinephrin solution (1:1000) immediately before use, irrespective of the strength of the novocain solution. But if no sterile novocain powder is available, the solution must undergo sterilization which may best be accomplished by making a half normal salt solution (0.45 gm. of sodium chlorid for each 100 c. c. of distilled water), boiling it gently for five minutes, throwing in the novocain powder, and boiling it for another couple of minutes and bringing the solution down to the temperature of the room, adding the solution of epinephrin just before use. Novocain solutions do not stand long or repeated boiling without deterioration, thus losing their anesthetic properties.

For operations on the skull, a 1 per cent solution is of sufficient strength to give rapid anesthesia of long duration without causing too extensive and too painful edema. For blocking the superior and inferior maxillary and the inferior dental and lingual nerves, from 2 c. c. to 3 c. c. of a 2 per cent solution is injected and for the infra-orbital or mental nerves, 2 c. c. of the same solution. For operations on the face, it is preferable to use small doses of a 1 per cent solution, so as to avoid the distortion of the anatomic features of the operative field.

As a rule, a hypodermic of sepolamin, 0.0002 gm. (1/300 gr.), and morphin, 0.01 gm. (1/6 gr.), is given one hour before the anesthesia is begun. This dose should be repeated half an hour after the first hypodermic if the patient is still nervous.

Shaving the scalp on or in the immediate vicinity of a wound and all other manipulations for purposes of disinfection are very painful. A good procedure is to shave a narrow circular band around the wound at about 5 cm. from its periphery and proceed with the anesthesia along that band. The wound can then be handled without giving pain and the operation performed without any supplementary infiltration.

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#### OCULAR TUBERCULOSIS

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In a review of eye lesions met with and accepted as tuberculous manifestations, the making of a proper diagnosis and the principles underlying successful treatment are the two essentials of practical importance. We are enabled to recognize tuberculous lesions by certain characteristic clinical appearances based on cumulative reports of well-proven cases, by the age, personal and family history, of the patient, by the exclusion of other well-known causative factors, but chiefly by the aid of the tuberculin reaction.

The fact is noteworthy that ocular tuberculosis commonly occurs in patients who seem to be in fair general health, patients in whom no other evidence of organic disease is readily recognized. Frequently, however, the personal

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history reveals a former pleurisy, tubercular adenitis, bone or joint lesion, or the x-ray examination discloses a pulmonary fibrosis, (e. g. caseous bronchial glands) and Fuchs contends that a primary tuberculous focus, although not demonstrable clinically, must be assumed to exist.

The pathologic histology of lesions is always atypical, and does not conform to the usual microscopic picture of tubercle; tubercle bacilli in the tissues are demonstrated with great difficulty and while inoculation diagnosis is frequently positive, it is rarely possible. Therefore, the diagnosis must be made largely upon the clinical appearance and the tuberculin reaction.

Stock<sup>1</sup>, von Hippel<sup>2</sup>, Verhoeff<sup>3</sup>, and others have demonstrated beyond all doubt the precise tuberculous nature of certain definite eye affections, and the possibility of their reproduction by inoculation experiments. It has been possible to find the tubercle bacilli in some of the lesions, the characteristic tubercle in others, to obtain fairly uniform general, local, and focal reaction of these patients to tuberculin injections, the control or cure of numerous cases by tuberculin treatment and successfully to reproduce practically every type of ocular tubercular lesion in animals, by inoculation experiment. Verhoeff<sup>3</sup> believes the method of ocular infection is somewhat as follows: A child becomes infected with tubercle bacilli, perhaps, and usually, of the bovine type. With increasing resistance of the patient, lesions heal. With lowered resistance, recurrences develop. Through the general circulation bacilli lodge in the capillaries of the ciliary body, find access through the aqueous to the pectinate ligament whence they may produce scleritis, keratitis, iritis, etc., through metastasis or by way of the lymph channels.

Most cases of episcleritis, scleritis, and sclerosing keratitis, certain other non-ulcerative types of keratitis, about 10 per cent of anterior uveitis and iritis, and a few types of exudative choroditis and choroido-retinitis are proven tubercular in their etiology.

Exogenous infection of the eye lids, conjunctiva, cornea, and lachrymal sac occurs less frequently than one would naturally expect in view of the numerous possibilities of con-

tamination from the sputum. The lachrymal fluid and conjunctiva are not good nutritive media for tubercle bacilli growth and some authors expressed doubt that contamination ever occurs without injury.

Lupus, psuedo-trachomatous and granulomatous conjunctivitis or pedunculated coxcomb excrescences originating from the tarsal surfaces or from the fornix are the infrequent lesions met with outside the globe. Fistulous ulcers originating from the orbital periostium, more frequently in the neighborhood of the lachrymal sac, also occur.

Whether or not so-called phlyctenular keratitis and conjunctivitis may be classified as tuberculous lesions is a question still unsettled. Derby<sup>4</sup>, Davis<sup>5</sup>, Wilder<sup>6</sup>, Goldbach<sup>7</sup>, and many others have reported series of cases with from 70 per cent to 90 per cent of positive von Pirquet or tuberculin injection reactions, physical evidences of tuberculosis being found in the vast majority of patients. While this condition runs a rapid, acute course and generally recovers without tuberculin, Derby found that all cases did better when it was used. It is entirely possible that the phlyctenulae are the manifestations of the tubercle-toxins or the faulty products of metabolism incidental to tuberculosis and are not caused by direct infection.

In all probability a large majority of scleritis cases are tuberculous. The involvement of the cornea and the anterior uveal tract with the sclera is quite uniform. Torok<sup>8</sup> reports twelve out of fourteen cases of scleritis giving positive tuberculin reactions, ten out of eleven treated with tuberculin being cured. He believes tuberculosis to be the chief, but by no means the sole, etiological factor in this condition and emphasizes the association of scleritis, keratitis and irido-cyclitis, and believes, with Verhoeff<sup>3</sup>, that the infection is distributed to adjacent tissues from the filtration angle.

Verhoeff was able to obtain tuberculin reactions in all the thirteen cases (all females) studied by him. Histological examination of nodules in four of his cases showed focal proliferation of epithelioid cells, occasional giant cells surrounded by lymphoid cells, and no evidence of caseation. Tubercle bacilli could not be demonstrated. Corneal involvement frequently

accompanies scleritis as either a characteristic tongue-like or a crescentic yellowish-white infiltrate pushing in from the limbus on the affected side, usually with one or more discrete areas of greater density. Occasionally outlying opacities in the deep lamellae of the cornea with a dense opaque center, gradually fading out into the surrounding layers like partially developed miliary tubercles, may be seen. There is slight if any tendency toward vascularization until well advanced stages. It is not uncommon for the corneal infiltrate to be separated from a border lesion at the limbus by a zone of clear cornea. The whole process may undergo complete regression under favorable conditions, as illustrated in the following cases.

*Case I. Scleritis with Keratitis.* Mr. J. P. C., 25, married, came on July 7th, 1915, complaining of inflammation of the right eye of four weeks duration, with inability to use his eyes in his near work on account of lachrymation and headaches. Vision R. E. 20/20???; L. E. 20/15. Examination showed an episcleritis in the right eye over external rectus insertion with a moderate nodular elevation, but no corneal involvement, which responded to treatment with atropine, mercuric oxide, and dionin in the course of a few months.

July 18, 1916, following an attack of mumps in Winnipeg, the right eye flared up in the same manner, with slight ciliary congestion also in the left eye. Vision in each eye was normal, but it was impossible for him to do any sustained work. There was an increasing ciliary congestion and gradually he developed a typical mild scleritis in each eye which did not materially improve under local treatment with atropine, heat and yellow oxide.

Dr. Turnbull of Winnipeg gave tuberculin tests twice which were reported by the patient to have been negative. The Wassermann was negative. Focal infection was found on radiographic examination of three teeth which were properly treated, but without any manifest improvement. The chest was negative. The clinical picture at this time was that of mild iritis and scleritis localized in distinct areas around the limbus but not extending far back from the cornea-scleral border. The fundi and media were normal.

Tuberculin injection, 2/3 mg. gave distinct reactions. In addition to local treatment with atropine, mercuric oxide, dionin, heat, dark glasses and at times, the use of the cautery over the lesions after the manner of Dupuy-duTemps, old tuberculin in doses of 1/10 to 1/2 mg. was given at weekly intervals over a period of nearly four months without, however, at any time producing any decided local or focal reactions, and with temperature on only a few occasions. The corneal lesions developing during this period consisted in the right eye of typical infil-

trations proceeding from the limbus, from two separate points, and in the left eye from three points, each having its origin from the limbus corresponding to the areas of greatest inflammation on the sclera. In each instance the infiltrated areas began to clear from the limbus, leaving clear cornea between the border of the cornea and what became ultimately detached corneal opacities. In the left eye there developed eight distinct dots of denser opacity, but none within the pupillary area and vision continued good.

No attempt to do any eye work was allowed during practically all of 1917, the patient being out of doors a good deal and in very fair physical condition. There being very little permanent improvement, von Hippel's method of giving very small doses of tuberculin was employed, without any decided improvement, and after a few months of this the use of fairly large doses was again resorted to, at times as much as 4 mg. and 5 mg. being given without marked reaction.

In August, 1917, there was distinct increase in the iritis for a few weeks, which was controlled by increasing the strength of the scopolamine. The condition of the eyes was becoming exceedingly chronic and at the suggestion of Dr. Longstreet Taylor, a change in the tuberculin was made. At my request, Dr. Taylor gave the tuberculin from now on, using Von Ruck's watery extract, in gradually increasing doses at weekly intervals for six weeks with periods of rest, with very slow but satisfactory results. The tuberculin was continued at intervals during the whole of 1918, vision remaining practically normal throughout the course of the disease owing to the nonexistence of corneal infiltrate in the pupillary area.

The improvement was gradual, the scleritis fading out very slowly with no new areas of involvement. The corneal opacities never became vascularized although here and there during the height of the inflammation one could make out new vessels emanating from the limbus for very short distances. The corneal opacities cleared up to the point where they were not noticeable to the naked eye, but examination with the loupe showed remaining deep nebulae at the points corresponding to the densest infiltration.

Severe adenitis, with suppuration of cervical glands necessitating operation developed and was operated upon on July 22, 1919 by Dr. John Cameron of St. Paul. Recovery was prompt and no further trouble developed.

On October 22, 1919, vision with correcting lenses was R. E. 20/15; L. E. 20/20. Examination of the fundus showed nothing abnormal and apparently it had remained uninvolved during the course of the disease. On August 5, 1920, vision was normal and there had been no recurrence, the patient being in excellent health and able to use his eyes normally.

In this case, the eye involvement was fairly typical, and both eyes were affected practically alike; re-



sponse to tuberculin treatment was not apparent although faithfully persisted in (with perhaps too large dosage), until a change in the product used was resorted to. Tuberculous adenitis developed following injections, but ultimately recovery was complete and there was no permanent impairment of either eye.

*Case II. Sclerosing Keratitis.* Mrs. H. K., 31, married, referred by Dr. Christianson of Morris, Minnesota, came on August 14, 1919, complaining of intermittent pain, redness and impaired vision of the left eye since February, 1919. The right eye had been enucleated several months previously after becoming entirely blind from inflammation resembling that now present in the left. The present inflammation in the left eye began before the right eye was enucleated.

The family and personal history, eyes excepted, was negative. General physical examination was negative excepting pregnancy advanced to the sixth month. Wassermann negative on two tests. Local treatment with heat, atropine, and dionin was instituted and mixed treatment begun.

Examination of the eye showed typical scleritis with nodular elevation at two distinct points around the limbus, deep ciliary congestion, moderate iritis and cornea nebulous at two distinct locations corresponding to the sites of densest infiltration over the sclera. The corneal opacities were entirely interstitial and avascular. There were a few scattered fine punctate opacities in the interstitial substance of the cornea. No. K. P. Vision was 20/150.

The temperature was normal for 48 hours, and on August 16th, 0.5 mg. of "O. T." was given subcutaneously, with mild general, local, and focal reaction. Temperature 99. The local treatment was continued, while tuberculin was administered at intervals of three days, using new tuberculin "T. R.". There were slight increases of times and on two occasions a suspicion of increased focal congestion following the injections, but no elevations of temperature. A series of twelve injections were given during the first course of tuberculin with decided improvement in the eye condition.

When seen again on October 27th, after a short series of injections by her home physician, the eye presented evidences of renewed inflammation. There was a new area of corneal infiltration projecting upward from the limbus at its lower border, a tongue-like projection with denser opacity in its advancing margin in the deepest layers of the cornea. The previous principal corneal infiltration above, was no longer connected with the limbus and showed a distinct zone of clear cornea between the limbus and the corneal opacity. At three distinct points over the sclera there was what seemed like phlyctenular elevations of episcleral tissue. These were treated locally with iodine and iodoform powder and ultimately disappeared entirely.

Tuberculin treatment was resumed November 17th with one minim doses of "T. R." 1:1000, which were

given at intervals of seven days each. The eye continued to improve under treatment as the tuberculin dosage was gradually increased to 1/5 and finally to 1/3 mg., and on December 27th, 1919, the eye had lost most of its deep injection with decided lessening of the scleral inflammation and beginning regression of the corneal opacities. Vision on December 3rd was 20/100.

In January, 1920, a perfectly healthy child was delivered without complication, the mother made a good convalescence, and the child has thrived. Two weeks after delivery, the mother developed bronchitis of a mild type which cleared up promptly. Examination of the sputum was negative for tubercle bacilli, during the bronchitis attack.

On February 17th, with correcting lens, vision had improved to 20/30 and the eye appeared entirely quiet; there was no redness and with the exception of the corneal opacities, the eye appeared normal. There remained, however, a deep bluish tinge to the sclera. Tuberculin injections were continued by her home physician at lengthened intervals, the local treatment consisting entirely of yellow-oxide ointment and dionin, for the purpose of clearing up the corneal opacity. On April 15, 1920, vision was 20/30 without cycloplegia, the eye was quiet and there had been no recurrence. On July 9, 1920, the eye was still quiet and excepting for the corneal opacity, had cleared up. There was no change in vision.

In all there had been given a total of about forty injections of T. R. besides the local treatment. Dosage was not the small infinitesimal amounts advocated by von Hippel and others, but was given to the limit short of reaction, the amounts never, however, exceeding eleven minims of 1:1000 sol. "T. R." The improvement manifested was, in my opinion, not entirely the result of tuberculin treatment and it is not conceivable to me that the inflammation could be entirely cleared up without the use of local measures. I consider the treatment aside from local measures, a valuable adjunct in securing the excellent results obtained in this case.

The scleritis usually clears up more rapidly and completely than the keratitis, but leaves a peculiar pale bluish sclera which is also quite characteristic. In three of the scleritis cases treated by the writer with tuberculin an adenitis developed, and in two of these removal of suppurating glands was required. In episcleritis the process less frequently involves the cornea. In both scleritis and episcleritis, females are affected about 3 times more frequently than males.

Mutton-fat deposits on Descemet's membrane often involving the deep lamellae, not infrequently accompany tubercular iritis or uveitis. These are not metastases from foci in the fil-

tration angle but are merely masses of leucocytes collected from the aqueous, such as occur in the ordinary manner with any cyclitis. They simply form larger masses in the tuberculous process. The damage to vision resulting from severe sclerosing keratitis may be marked and has led to complete blindness in both eyes in two of the writer's patients.

The following case illustrates the extreme impairment of vision occasionally occurring as well as the length of time which may elapse between involvement of the first and second eyes.

*Case III.* L. L., unmarried, 25, referred by Dr. C. L. Greene, came on August 26, 1909, on account of a blind and inflamed right eye. Left eye was normal in appearance and vision was 20/15. Examination of the right eye showed moderate ciliary congestion over a deep bluish discolored sclera (typical of healed anterior uveitis), moderate ectasia of the sclera, an entirely opaque cornea from what had apparently been a sclerosing keratitis. Vision nil, tension plus. In the cornea could be distinctly seen new formed vessels of considerable size. There were areas of denser and other of lesser opacity; in places the iris entirely invisible, in other areas the iris visible through the less dense opacity, lying close to the cornea with very shallow anterior chamber.

The left eye at this time showed vision 20/15, the cornea, media and fundus were normal, and several examinations of the sound eye between August, 1909, and April 6, 1916, showed nothing abnormal. When examined on the last date named, the patient complained of photophobia, but nothing could be detected to account for the trouble. Tinted lens in her distant correction relieved her complaint.

The family history was bad, one brother and one sister dying of pulmonary tuberculosis. The personal history was exceptionally good, the patient robust and except for the usual diseases of childhood, there had been no serious illness.

Physical examination by her family physician, Dr. McLain of Fergus Falls, and by Dr. Greene had not evidenced any pulmonary or other trouble excepting eight root abscesses in teeth, which were extracted. There were some recurrences of inflammation in the blind eye at intervals, controlled by local treatment. February 13, 1917, the patient came for treatment because the left eye was inflamed and irritable to light. Examination showed two distinct areas of episcleritis, one over the external, the other over the inferior rectus muscle, with distinct nodular elevation and quite intense local injection. This attack was treated with local measures for six weeks with favorable results. Recurrence developed a few months later and she consulted a number of oculists who believed the condition due to interstitial keratitis of doubtful or possible tuberculous origin. The Wassermann tests were negative. Physical examination at the Rochester Clinic showed nothing bearing upon

the etiology. Tuberculin treatment had been instituted by Dr. Carl Fischer of the Mayo Clinic and he considered this the most probable cause of the old lesions in the blind right eye.

Tuberculin test given on February 20, 1917, was distinctly positive in all phases and tuberculin treatment with small doses was begun and carried out, injections being given to the point of tolerance short of reaction for several weeks. The cornea of the left eye was considerably involved in the inflammatory process at that time, typical sclerotic areas of infiltration developing during the course of what may be termed a fugacious scleritis in which the intensity of scleral inflammation shifted from time to time, around the corneo-scleral ring. More definite elevations appeared from time to time over the insertion of the recti muscles, subsiding only to reappear. There was always more or less ciliary congestion. New points of infiltration appeared at the limbus invading clear cornea until there was practically no point in the periphery of the cornea uninvolved in the process. The central area of the cornea remained uninvaded until September, 1917, when vision was reduced to 6/100, vision being obtained through an eccentric area of cornea above the normal pupil with the aid of a dilated pupil.

The eye ultimately quieted, but without regression of the corneal opacification so that when last seen there was practically complete loss of vision. Seven years had elapsed between involvement of the first and second eyes.

In this case, tuberculin was used intermittently by several oculists. The dosage varied from 1-3000 mg. to a maximum of 3 mg. which was about the limit of tolerance short of reaction. The failure of treatment to effect a cure in this case, the inability to establish an immunity or promote regression of the process is one of the few instances in which I was unable to note any favorable action.

(Unfortunately, one cannot always report cures.)

Cases of typical parenchymatous keratitis in children are frequently reported as tuberculous. There can be little doubt that the vast majority of them are luetic and assuredly a far larger percentage of cases respond to the Wasserman than to the tuberculin test. One rarely sees a juvenile patient with parenchymatous keratitis not clearly of syphilitic origin. Whether originating from either cause the clinical picture is practically the same.

An exhaustive study of iritis by Brown and Irons<sup>9</sup>, including careful history and physical examinations to detect evidences of focal infections, syphilis, and tuberculosis including tuberculin tests, proved tuberculosis to be the sole cause in 8 and a coincident infection in 16 of 100 cases studied.

When tubercle nodules are lacking and in the



absence of evidence afforded by other diagnostic tests, or when no other focal infection can be found, serious consideration of a possible tuberculous etiology depends largely upon obtaining a positive tuberculin test, especially in cases which are chronic, or at least indolent under other forms of treatment. In nodular iritis, in which, as Tooke<sup>10</sup> affirms, "there is no site of predilection for the nodules either at the root or pupillary margin of the iris"; no matter what the Wassermann tests may show, von Pirquet or subcutaneous injection tests should be given. In a series of cases reported by Tooke, he states that "the nodules are more numerous on the posterior than on the anterior surface of the iris. One can only find giant cells in those cases where the process has been active for months and tubercle bacilli could be demonstrated only in cases where central caseation of the individual tubercle had occurred". The thickness and infiltration of the iris may make the detection of nodules very difficult and here the corneal microscope is of value. The iris is rarely involved without the clinical picture including, that of a more or less chronic uveitis. Torok<sup>8</sup> found about one-half of his tuberculous uveitis cases were benefitted by treatment with tuberculin. The following cases are fairly typical of chronic tubercular irido-cyclitis or anterior uveitis.

*Case IV.* Mrs. W. S. R., referred by Dr. W. H. Dodge, Farmington, Minnesota. This patient came February 25, 1917, complaining of blurred vision with the right eye of one week's duration. She stated that permanent impairment of vision in the left eye dating from 1910 had begun exactly like this attack. Vision in the right eye was 20/50; in the left eye 20/100.

Examination of the right eye showed a dull cornea due to descemetitis and clouded aqueous, slight thickening of the iris with few synechia, but accompanied by very little pericorneal congestion. The iris while thickened did not at this, or at subsequent examinations, show any distinct nodules. The eye picture was that of a chronic, low-grade uveitis.

Examination of the left eye showed the cornea clear except for one permanent sharply defined opacity, very small and almost in the center of the cornea. The anterior chamber normal in depth, the iris containing evidences of old iritis in the iris folds and a thin layer of organized exudate almost completely, but not entirely occluding the pupil.

The family and personal history contained nothing bearing upon the eye condition. The physical examination of the patient was negative, but she was

under weight, tired out, nervous and subject to attacks of indigestion marked by hyperacidity. The Wasserman was negative on this and later examinations. Radiographic examination at a later date showed an old fibrosis in the apex of the right lung, but there were never found any evidences of active tuberculous trouble.

Under local treatment alone, the right eye cleared up from this attack in about four weeks, vision being normal when tested on April 26. May 15, there was a slight recurrence similar to the first, responding less rapidly to treatment; the deposits on Descemet's membrane were slow in disappearing.

May 26, one mg. of "O. T." was given, followed next day by focal and local reactions, but with practically no general reaction. On May 31, a three mg. injection was given with decided reactions, local, focal, and general, temperature reaching 102°. Under combined local and tuberculin "T. R." injection, the eye steadily improved, the K. P. disappeared, and the condition remained quiet under systematic treatment for about three months.

October 13, 1919, there was return of the condition with more ciliary congestion than previously, vision again fell not only in this eye, but in the left which had remained quiet for seven years and continued to drop with each of the slight exacerbations which developed in one eye or the other during succeeding months. There was little variation in the clinical appearance of the eyes—that of a low-grade chronic uveitis characterized by tiny but numerous deposits on Descemet's membrane which were never of the mutton-fat type. On the contrary, in this case they were unusually fine and at times, practically alike in both eyes. The pupils became more or less occluded by a thin film of organized exudate. Vision on January 28, 1920, had dropped to R. E. 8/65; L. E. 1/200. The sclera was uninvolved in the process at any time.

A period of one month's rest in bed, stimulation of metabolism with endocrine therapy (small doses of Thyroid extract, alternated with anterior lobepituitary extract) and continuation of small doses of "T. R.", 1/1000 mg., resulted in gradual improvement in the uveitis. On account of the pupillary exudate vision remained the same on Sept. 1, 1920, as above.

Tuberculin was faithfully and persistently used over a period of eighteen months, with periods of intermission, no reactions of consequence occurring, even when the dose had attained five mg. There was gradual increase of 24 pounds in weight.

The local treatment of the eye consisted of cycloplegics and local lymphagogues, heat and dark glasses. During 1917 with the first attack subconjunctival injections were given with some benefit apparently, later discontinued when the condition was definitely diagnosed.

This patient is still under treatment and observation and while there have been almost no active manifestations of trouble in either eye for the past nine months, I do not consider her a cured case. I think

the tuberculin has had a most beneficial influence upon the progress and possibly has permanently stopped the disease.

*Case V. Anterior Uveitis.* Mrs. P. T., age 39, came on January 11, 1917, complaining of persistent inflammation of right eye dating from April, 1916, which had not improved under atropine, heat, collyria, etc. The left eye had been similarly affected and was now quiet.

One sister had died of tuberculosis at age of twenty-five. The patient had typhoid fever at age of ten and has had cervical adenitis since childhood. She has had four children and one miscarriage in the fourth month. Three of the children are living and well. The other child died of erysipelas when two years old. The patient has not had tonsils removed, but many teeth have been extracted on account of apical abscesses. Examination of nares shows enlarged middle turbinates, sinuses clear, and no evidence of focal infection in the nares or mouth. Wassermann's taken at this time and subsequently were negative.

Examination of the right eye showed moderate pericorneal injection, iris not thickened or adherent, and anterior chamber normal. The sclera was infiltrated over about the anterior third of its exposed portion with two areas of denser brawny thickening. There was slight corneal involvement—a faint nebula near the temporal margin. The fundus was normal and media clear. Vision was 20/40.

The left eye showed typical blue sclera without distinct staphyloma. There was no ciliary congestion. Tension was slightly minus. From all borders of the limbus there were small irregular opacities extending toward the center of the cornea. Within and partly filling the pupillary corneal area there was an interstitial opacity. Old blood vessels projected from the limbus toward the center of the cornea from many points. There was more or less interstitial haze throughout the cornea. Vision was 20/50 minus.

The temperature was normal for four days. On Jan. 20, 1917, 1 c. c. "O. T." 1:1000 produced local, focal, and general reaction. Temperature 99.6. In addition to local treatment with atropine, tuberculin treatment was given systematically at intervals of five to seven days. The patient was found to be exceedingly sensitive to tuberculin and several complete reactions were produced, necessitating careful regulation of frequency and size of dosage.

Susceptibility to atropine was also marked, although scopolamine could be used in weak solutions without irritation.

During February and March, 1917, nodular episcleritis developed over the insertions of the external and superior recti. These were cauterized lightly and treated with iodine locally without benefit. The area of infiltration over the superior rectus continued thickened and there developed a projecting tongue of corneal infiltrate from this margin with

new corneal vessels pushing into the corneal stroma in June, 1917.

During the summer of 1917, several teeth were extracted invariably followed by exacerbation of the ocular inflammation. August 28, 1917, there was moderately severe iritis with pupil only partially dilated under atropine. Temperature reactions occurred when dosage of "O. T." was increased from 2 to 3 mg. During succeeding months of continued faithful treatment there were periods of improvement and exacerbations quite typical of chronic ocular tuberculosis, the improvement being noticeable when the patient could secure sufficient rest and freedom from domestic work and responsibility. It was frequently necessary to decrease the tuberculin dosage and then increase cautiously. It was definitely ascertained that if dosage was not increased over one minim to 1:1000 "O. T.", no reaction occurred and progress was possible. This patient has been under almost continuous treatment and observation over a period of three years, tuberculin being employed at regular intervals, with intermissions. There has been no recurrence of trouble in the left eye.

Examination on September 23, 1920, shows the left eye practically the same as when first seen; in the right eye, the anterior segment of the sclera shows a peculiar mixture of blue-slate discoloration without episcleral thickening, the superficial bulbar conjunctiva slightly congested. The deep ciliary vessels are visibly congested. The anterior chamber is normal and iris not unduly thickened nor adherent. There is slight haziness of the vitreous, the retina and nerve are normal although veins appear enlarged in calibre.

There are several tongue-like corneal infiltrations separated from the limbus by clear areas of cornea, traversed by new formed corneal vessels. Several small outlying discrete opacities, round, about  $\frac{1}{2}$  to 1 mm. in diameter suggest tiny miliary tubercles, one of these fading off into surrounding tissue on all its borders. Vision is 20/40 minus.

The eye has become fairly quiet and rarely becomes severely inflamed, but cannot be pronounced cured. It is improved. One cannot say that this patient received the slightest evidence of continued improvement until dosage was definitely held down (1-15 mg. maximum) and until she was given sufficient rest and tonic treatment to raise general resistance above normal.

(Patient shown at the meeting).

In the choroid we meet with three distinct forms of lesions: conglomerate tubercle, which is fairly rare, miliary tubercles in the choroid, and exudative choroiditis.

Conglomerate tubercle is frequently mistaken for neoplasm and may resemble glioma. In either case the condition always necessitates enucleation. Miliary tubercle of the choroid, I believe is much more frequent than is com-



monly supposed. The tubercles are fairly true to type and when seen in the acute state, appear ophthalmoscopically as irregular patches of yellowish gray exudate or as slightly elevated oval or irregular areas with poorly defined margins, often obscured by exudate in the adjacent vitreous. They usually lie under or at the side of one of the larger vessels, or the retinal vessels may course over them. In the later stages and in old processes which have healed, pigment changes occur, without, however, any characteristic picture.

Exudative choroiditis with multiple yellowish patches, especially along the vessels at the equator, or as single lesions in any part of the fundus, leaves atrophic areas which become whiter with time. The diagnosis must be based upon the ophthalmoscopic appearance, absence of syphilis and focal infections, and positive tuberculin reactions.

It is difficult to separate choroidal from retinal lesions. Frequently the patient complains of either localized or diffuse impairment of vision due to vitreous exudate that cannot be definitely connected with any retinal lesion, the ophthalmoscope revealing nothing other than the vitreous exudate. Careful search sooner or later may reveal the origin of the exudate or hemorrhage emanating from a retinal vessel, usually a vein. These retinal vitreous exudates may undergo complete absorption, but not infrequently they become organized and vascularized, or may become fibrous bands of tissues which present the picture known as "retinitis proliferans". For the most part, the hemorrhages occur in young adults who apparently are in good health. There is distinct tendency to recurrence. Diagnosis in these cases must as Jackson<sup>11</sup> has pointed out, be based upon the "vitreous opacities, recurring retinal and vitreous hemorrhages, enlargement of the retinal veins, local lesions associated with large retinal vessels, white spots in the macula in some cases, optic neuritis, and 'retinitis proliferans' as a terminal condition; the earlier lesions giving reactions to tuberculin injections, and their involution favored by tuberculin therapy". Cases typical of this type follow.

*Case VI. Choroidal Tubercle.* F. O., 17, referred by Dr. Oliver Porter, of Atwater, was first seen August 13, 1920, complaining of dimness of vision and corneal nebula over left pupil, first noticed four

months previously. The corneal opacity was not dense. During the previous few weeks, the condition advanced rapidly with increasing impairment of vision. General health had been good and there was nothing of importance in the personal or family history.

Examination of the left eye showed marked pericorneal injection with a dense grayish, irregular, somewhat circular opacity in the interstitial substance of the cornea, the edges somewhat sharply defined. While Descemet's membrane seems to be partly covered with a layer of exudate, there were no definite K. P., although many criss-cross lines.

Vision in the left eye was 20/70. The right eye appears normal, vision 20/15, fundus negative.

The physical examination, physical and fluoroscopic examinations, urinalysis and Wassermann tests were negative and the blood count and hemoglobin tests were normal. When first seen the patient was running one degree of temperature daily. Treatment locally with atropine, dionin, and heat caused the ciliary congestion to subside, the cornea became less clouded, vision improved and the view of the fundus was more easily obtained. Small K. P. could now be seen on Descemet's membrane. The fundus picture was that of a quite distinct tubercle-like structure in the upper nasal field; a central whitish-yellow mass, irregularly oval in shape surrounded by pigment deposit, lying adjacent to the superior nasal vein the mass being about 5 mm. in length through its greatest dimension. In the vitreous and apparently connected with the tubercle itself, a fairly organized mass of exudate projected obliquely forward as a grayish membrane.

August 25th, vision was 20/25, temperature was practically normal and continued so. September 1st, one c. c. of "O. T." was injected subcutaneously without any reaction whatsoever.

September 10th, a two c. c. injection of "O. T." was given with distinct general reaction, but with no apparent change in the fundus condition. Vision at this time was 20/20 with correcting lenses the cornea had cleared, and the patient returned to her home. Directions were given for the continued injections of "T. R." in doses short of reaction by her home physician.

The diagnosis in this case rested largely upon the ophthalmoscopic appearance, the absence of other focal infections and a general reaction to tuberculin. While local treatment seems to have caused the symptoms to subside with unusual rapidity, the process is to be considered as one of a tubercle of many months duration, lighting up suddenly with an explosion of exudate into the vitreous, descemetitis, with a mild accompanying keratitis and iritis. The patient's excellent general condition and the establishment of an immunity probably accounts for the rapid improvement under treatment. Further observation will, in all probability, show manifestations when resistance again becomes lowered.

*Case VII. Retinal tubercle.* Mrs. S. M. P., Duluth,

26, in good general health and without definite personal or family history of tuberculosis, came June 18th, 1917, complaining of impairment of vision in the left eye on two previous occasions. She had been seen by Dr. Casey Wood of Chicago and by Dr. Schneider of Milwaukee. The first attack occurred in the summer of 1915, the second in March, 1917.

Vision in the right eye was 20/20+, left eye 20/20??. Ophthalmoscopic examination showed what had, apparently, been a small retinal hemorrhage along the inferior temporal artery almost bordering upon the disc margin. There were two distinct nodular masses with a third small patch of exudate along the vessel, grayish-white in color, without appreciable pigment change, the vessels passing partly over these masses which were about one-third and one-fourth disc diameter in size. As the patient could not remain for further study at the time, and in view of the fact that vision was reported as improving, no tuberculin test was given.

September 15th, the patient was again examined on account of a recent further impairment of vision and showed the condition practically unchanged as regards the appearance of the tubercles, but there was distinct clouding of the adjacent vitreous with some "soot" throughout the fluid. However, vision was 20/25. The macula appeared normal and there were no new lesions visible in either fundus. Examination of sinuses and tonsils was negative. The urine and blood were negative.

Physical examination by Dr. H. L. Taylor, with x-ray findings by Dr. Cole of Pokegama Sanatorium showed: "Tubercular glands of the thorax and recent involvement of the right apex. The glands along the lower bronchus of the right lung show numerous beaded and calcified appearance." General and local reactions were obtained after the third test with the three mg. of old tuberculin, without changes in the retinal focus. Patient was sent to Pokegama, where in addition to rest and tonic treatment, she received a course of von Ruck's serum, and where she gained in weight.

March 3, 1918, examination showed the condition quiet, vitreous clear, no change in the appearance of the tubercles except an apparent shrinkage in size with less elevation. Vision was practically normal with correcting lenses. Patient had gained 16 pounds in weight, the lungs were free from symptoms and general health excellent. She had continued with tuberculin treatment under the director of Nopeming Sanatorium. When examined again in August, 1918, the tubercles appeared replaced by connective tissue, with some pigment changes.

October 6th, 1919, again examined on account of recent slight blurring of vision. There was a very slight amount of exudate in the vitreous, but no appreciable change in the lesion. Vision was normal. A course of immunizing injections was given by Dr. Laird with Deny's "B. F." tuberculin beginning with 1:1000 mg.

When last seen April 17th, 1920, vision had re-

mained normal and no further change observed in the now atrophic tubercle scars.

This patient, observed over three years, showed what probably quite typically occurs in miliary retinal tubercle under favorable conditions and with established immunity. The condition was one of undoubted tubercle of the retina without damage as yet to vision, made possible of diagnosis by associated physical evidences, tuberculin reaction and the clinical appearance ophthalmoscopically.

The whole subject of tuberculin is interesting and of unusual importance in the diagnosis and treatment of the conditions described. The focal reaction is of the greatest value (the evidence consisting mainly of an increased hyperemia), but general and local without definite focal reaction are of sufficient value to aid diagnosis. The evidence afforded by reactions may be interpreted wrongly and fallacious deductions are easily possible. Naturally, the possibility of positive general reactions in all adults makes it injudicious to invariably accept the test at its face value; all the evidence must be carefully sifted, tests must be repeated, other foci of infection must be sought for and considered in the etiological diagnosis.

The routine test with old tuberculin gives most reliable results for diagnosis although the von Pirquet test is used by many oculists who recognize and fear the dangers of realighting latent foci by marked reactions in the eye. Especially in retinal lesions where the focal reactions cannot always be easily observed, damage to vision may result from the excessive hyperaemia characterizing marked reactions. H. Wood<sup>12</sup> had cited instances of harmful effect upon vision, believes focal reactions should be avoided in intra-ocular lesions and urged the avoidance of tuberculin as a therapeutic measure in acute cases. He believes its use should be reserved for non-progressive chronic cases, and further urges ophthalmologists to conduct treatment with tuberculin "under the guidance of one trained in immunologic problems". There is no such thing as uniform dosage in the use of tuberculin, as all who have used it much can testify. For those who only occasionally need to make use of it diagnostically or therapeutically, team work with the internist is both desirable and advisable.

In the diagnosis of any suspected eye lesion, the physical examination, case history, roentgenology, nose and throat examinations, and



search for other evidence of focal infection, etc. should never be neglected. There can be no doubt that, when correctly used, tuberculin is one of our most valued aids. So far as concerns ocular tuberculosis at least, it is uniformly agreed that therapeutic dosage should always be short of reaction and very cautiously increased with the sole purpose of developing immunity while also increasing resistance by proper hygiene, rest, food, tonics, etc. The majority of cases, as already stated, requiring more than local treatment are progressive cases of the chronic type and the results of tuberculin therapy, especially in lesions of the anterior quadrant of the globe, are distinctly good. It is possible that fundus lesions, because of the ophthalmoscopic difficulties of observation do not convince us of its value so satisfactorily as in those conditions easier of study. In general its use affords the ophthalmologist a valuable weapon in the treatment of tuberculous lesions of the eye which are not so rare as formerly believed, but which because of their chronic course, present so many difficulties of treatment.

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#### DISCUSSION

DR. W. W. LEWIS, St. Paul: Tuberculosis in ophthalmology has been of deep interest to me because of early impressions. In my preparatory work I heard Professor Utthoff of Breslau remark that he believed tuberculosis would rapidly become one of the largest subjects in the pathology of ophthalmology. I heard Lauber of the Dimmer Clinic say that he believed that all cases of spontaneous intrabulbar hemorrhage in young adults were from tuberculosis. Now after many years Jackson's paper on that subject has rekindled our interest. Since I have been especially interested in this subject I have kept in close touch with Dr. Boeckman Sr., and Dr. Burch

and their interest in it has intensified my interest. Dr. Burch's paper of 1917 I considered a very valuable contribution to the subject. I believe the blanket diagnosis of syphilis for most ocular lesions will be rapidly broken down and tuberculosis and focal infection will rapidly supplant such diagnosis in most cases. The old order of ocular diagnosis, which was syphilis, focal infection and tuberculosis, I believe will be in the future either tuberculosis or focal infection first, and syphilis last. We know that in general postmortem findings a great percentage of subjects have shown tuberculosis why not the same proportion in ocular lesions? Why can we not deduct from that that the presence of tuberculosis in ophthalmology is more frequent than is generally supposed at this time?

The recognition of tuberculosis in ophthalmology has been slow. Tuberculosis of the episclera and sclera though slowly recognized at first is generally thought now to be of tuberculous origin by most eye men. While frank cases of eczematosa of the cornea in children have been recognized, I think the tendency to overlook eczematosis in adults has been common. The lesions in children are very marked and typical of the phlyctenular type. In the adult the lesion is more often in the center of the cornea and is not recognized as eczematosis. Sclerosing keratitis recently has been regarded as tuberculosis, but then this form has not long been regarded as tuberculosis when it appeared in the very acute form with so-called tongue-like vascular projections radiating from the limbus, that Dr. Burch spoke of. There is another form of keratitis which has deeply interested me and which I believe is tubercular. That is the rather sudden appearing multiple, discrete superficial ulcers of the cornea, well separated from the limbus, and of intense infiltration sharply defined by clear uninfiltated corneal tissue. In adults, over night, a group of these ulcers will appear and rapidly break down into open ulcerations. The very marked symptoms will soon subside under atropine and heat and clear up but will recur again and again. I would like to say considerable more about this subject, but I do not believe the time will permit.

DR. W. R. MURRAY, Minneapolis: Ocular tuberculosis is not nearly as infrequent as generally supposed, as shown by the statistics that Dr. Burch has quoted. This is a phase of tuberculosis that is extremely interesting. The mode of onset in ocular tuberculosis is often difficult to explain. It may be that it occurs from sources outside of the eye, as in certain cases of conjunctivitis of tuberculous origin, and possibly in some cases of corneal infection. However, it is generally accepted that the infection is secondary to some other focus of infection in some other part of the body, although it is sometimes difficult to ascertain this focus of infection. I think it is rather unusual to find ocular tuberculosis in a subject with pulmonary tuberculosis.

I would like to report a case which is now under my observation and the patient is present in the hall

if any one cares to examine the case. It is one that is very typical. A woman, aged 43, consulted me in November, 1911, on account of an inflamed left eye. Six months previous the left eye had become inflamed and painful and after some treatment the condition subsided. Two months later the eye again became inflamed. Four days before I examined her a white spot appeared in the corneal substance. The history of the patient is somewhat negative. She had a mild arthritis at the age of 18; double ovariectomy at 25. Seven or eight months preceding the onset of the eye trouble she had taken care of a relative with pulmonary tuberculosis.

Examination of the left eye showed the presence of sclerosis and areas of infiltration in the cornea. The iris was normal with normal pupillary reaction. There was no clinical evidence at that time of involvement of the uveal tract. There was some injection of the sclerotic vessels. The right eye was normal. The condition seemed to be one of corneal involvement with some injection of the vessels of the sclera.

Four days later I referred the case to Dr. Head for general physical examination. This was negative; no focus or infection found. A diagnostic injection of tuberculin was given by Dr. Head, which resulted in marked local and marked general reaction. Following this diagnostic injection of tuberculin there was an increase in the injection of the vessels of the sclera about the margin of the cornea and the corneal infiltration seemed to become somewhat more active. The condition seemed to progress slightly though not markedly. Therapeutic doses of tuberculin were then given, when the active condition subsided, beginning with 1/100000 of a milligram and increasing to 1/500. After this treatment the condition cleared up somewhat. I did not see the case again until 1920. The left eye had remained quiet during that period. In 1920 the patient returned with a somewhat similar condition in the right eye. A diagnostic injection of tuberculin was given consisting of 1/25 c. c. of tuberculin from the Bureau of Animal Industry at Washington, which corresponds to 4 mg. of old tuberculin. This was followed by a marked reaction in the right eye and the lesion spread over the entire cornea. She presents a typical picture of tuberculosis of the cornea. I have a water color sketch of the eye here which shows the condition very well and perhaps you can get a better idea from the picture of the extent of the lesion.

DR. PAUL D. BERRISFORD, St. Paul, Minn.: The employment of tuberculin in ocular tuberculosis is recognized by eminent ophthalmologists the world over as the treatment *per se*. However, this therapeutic agent is not to be regarded with enthusiasm for, in general, its use must be long continued and the result obtained is often uncertain. It has been my good fortune through association to profit by the experience of a man 40 years in the practice of ophthalmology, a man who was the first to use tuberculin in the city of St. Paul. He has employed it continuously to date.

In discussing the value of tuberculin with him recently we summarized our conclusions as follows:

(1) In the treatment of ocular tuberculosis with tuberculin, some cases are markedly improved, some cases moderately improved, some cases made decidedly worse.

(2) Treatment with tuberculin does not prevent relapses.

(3) Those cases of ocular tuberculosis that respond best to tuberculin are those of nodular iritis unaccompanied by secondary glaucoma or fundal changes.

(4) Given two cases of ocular tuberculosis presenting a striking similarity in clinical appearance and severity, one may show marked improvement under therapeutic doses of tuberculin, the other became worse. One never knows before hand.

(5) Tuberculin as a curative agent should not be used in children; their natural resistance is such that tuberculin is unnecessary. In the aged tuberculin should be contraindicated; their resistance is poor; they do not tolerate it well.

(6) In the use of tuberculin as a therapeutic agent the attempt to establish a routine, graduated dosage administered at certain fixed intervals is folly. Each patient is an individual study and must be administered to accordingly.

(7) To prove an ocular disease tuberculous one must not only produce with a diagnostic dose of tuberculin a local and a general reaction but also a focal reaction.

DR. C. N. SPRATT, Minneapolis: I would like to speak on one phase of tuberculosis of the eye, namely, scleritis and sclero-keratitis. In the autumn of 1905, I had the opportunity of seeing some of the experimental work on rabbits by Stock of Frieberg and later on returning to this country had an opportunity of seeing Verhoff of Boston who was one of the pioneers in working out the relationship of tuberculosis and scleritis. Dr. Berrisford has mentioned the fact that Dr. Boeckmann for years had been calling attention to this but I believe that he did not publish anything. In 1906, I read a paper before this society where I reported a number of cases of sclero-keratitis treated with tuberculin. I then thought as Dr. Verhoff did that we got better results with doses of sufficient size to produce small reactions. I received quite a jar on reading Dr. Verhoff's discussion of Week's paper before the American Ophthalmological Society in June, 1918, in which Verhoff states that his views have entirely changed and he does not rely upon tuberculin as a remedy, but now believes that hygienic measures are of more benefit. There is no question that tuberculin must be used with extreme care.

Within the past year, I have had a man with a mild form of scleritis; developed lung complications with a diagnostic dose of three milligrams of Old Tuberculin.

DR. WILLIAM BENEDICT, Rochester: I think it is well to call the attention of any group of medical



men to the ocular phase of tuberculosis. Dr. Burch has covered the ground well. I am glad he did not emphasize treatment with tuberculin, because we are all disappointed with the tuberculin treatment in ocular tuberculosis.

The diagnosis of tuberculosis of the eye in many instances is anything but clear. Some cases of iritis which closely resemble tuberculosis have been demonstrated in the laboratory to be due to certain types of focal infection. Phlyctenulosis of the eye has been studied by parasitologists, particularly by Luna, who believes that it is caused by pediculosis capitis. Cases of tuberculosis of the eye are not due to the invasion of the tissues by tubercle bacilli but are due to secondary changes from the presence of tubercle bacilli in other parts of the body. We have tuberculids of the eye which are similar to tuberculids of other parts of the body and which are not cleared up by tuberculin but are made worse. On the other hand, they are rapidly cleared up by salvarsan. The corneal opacities will disappear just as tuberculids of the skin will disappear under salvarsan treatment.

DR. F. E. BURCH, St. Paul, (closing): I am very glad to bring out this discussion. We are grateful to Dr. Berrisford for giving us Dr. Boeckmann's experience with tuberculin.

There is one thing about tuberculin that we do not know much about and that is the dosage. Also sometimes a patient getting old tuberculin when changed to new seems to make better progress. One case which we treated for a long time with new tuberculin made very little progress until we changed to the old. At the suggestion of Dr. Longstreet Taylor, in one case reported, Von Ruck's serum was used and a change in the patient's condition was manifested very soon. These varying results with different tuberculins may be merely a coincidence or may be due to a lack of understanding of the therapeutics of tuberculin.

One thing about the prevention of recurrences. I think the whole theory of giving tuberculin therapeutically after having given a diagnostic dose, is an immunological problem. If we are going to get any benefit, if we are going to prevent recurrences in these cases, and they are remarkably prone to recurrences, it is by establishing immunity through the aid of very small doses of tuberculin. I thoroughly believe in that and I believe any patient who is cured should continue to get tuberculin injections purely for immunological purposes.



## METHODS OF MEETING THE SO-CALLED SHORTCOMINGS OF LOCAL ANESTHESIA\*

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In discussing this subject, the real as well as the imaginary shortcomings of local anesthesia must be considered. That this method like all others has real shortcomings, is admitted. However, there are unfortunately charged against the method, some imaginary shortcomings, and there are also border-line points which may be said to lie on one side or the other, depending upon one's point of view. In this communication, it is the writer's purpose to discuss a number of so-called shortcomings of local anesthesia, in an effort to differentiate the imaginary from the real on the one hand, and on the other, to discuss methods by which some of the real shortcomings may be met.

One of the objections most frequently offered to the use of local anesthesia, relates to the psychic effects of an operation performed upon a conscious patient. That this objection is founded to a certain extent upon fact, can not be gainsaid. However, its degree differs with different individuals, and is dependent upon factors, some of which are not under control and therefore can not be eliminated, but as well upon other factors, which are largely under the control of the surgeon. Fortunately, the latter outweigh the former to such an extent, that it would seem to the writer that it is only a question of time when the results of the proper exhibition of the use of local anesthesia will become sufficiently widely disseminated through the minds of the laity, so that many of the factors which are now considered as shortcomings, will be enlisted in the category of advantages. We shall perhaps, always find an occasional individual who will unreasoningly demand that surgical operations of any nature be performed under general narcosis. We shall, probably, also always find an occasional individual who while conscious, can not retain his self control while undergoing a surgical operation of any nature. Another class, of which the thyroid toxicoses is an exam-

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

ple, may prove to be more safely handled under some form of general anesthesia on account of the psychic disturbances which any excitement is prone to produce in these cases. Eliminating these, we may ask the question—upon what is the psychic incompatibility to local anesthesia founded? An analysis of this subject based upon fifteen years of painstaking investigation, leads me to the conclusion that the objections of patients to undergoing operations under local anesthesia are based on premises which in the main are false. The precedence of general over practical local anesthesia of approximately sixty years, quite naturally places local anesthesia in a secondary position in the lay mind. Added to this, we have the attitude of the majority of the leading surgeons of the world which is decidedly unfavorable to the method, and we also have to contend with the lamentable fact, that so large a percentage of operations performed under local anesthesia are done under a technic which leaves the patient no choice but to become an active anti-local propagandist. When those who essay to perform operations under local anesthesia so perfect their technic, that the reverse of this becomes the rule, rather than the exception, and when surgeons and patients in general begin to reflect with more universal accord the best fruit of the method psychic incompatibility,—so-called, will largely disappear as one of the shortcomings of local anesthesia, and greater knowledge will really be an advantage.

*Mixed Anesthesia:* Local anesthesia like all other things, has its limits. The fact that certain operations can not be performed under its influence exclusively, or the fact that portions of certain operations demand general narcosis, should not be looked upon as a shortcoming of the method. An attempt to do the impossible, with the inevitable result—failure—should be looked upon rather as a shortcoming of the surgeon. A large variety of procedures may be begun and finished under the use of local anesthesia, with the utmost satisfaction, although some portion of the procedure may demand general narcosis. Fortunately, there is not the slightest incompatibility between local and general anesthesia, and indeed, ether is said to be antidotal to novocain. This gives the surgeon the opportunity of performing the first stages

of an operation under local, obtaining a general survey of conditions, especially in abdominal work, and employing general narcosis should it become necessary, only during that portion of the operation which can not be painlessly carried out under local, and completing the operation as a rule, with a conscious patient. This method has the great advantage of being the means of developing an ability on the part of the surgeon to meet many of the so-called shortcomings of local anesthesia, and its conscientious use will, to a surprising extent, enlarge the scope of local anesthesia in the hands of any surgeon. In my own work for instance, a variety of conditions are now handled under the local method almost as a matter of routine, which but a few years ago I placed in the "impossible" class.

*Abdominal Explorations:* One of the so-called shortcomings of local anesthesia in abdominal work is, that under its use, explorations of the general abdominal cavity are impossible. That this is true to a certain extent must be admitted, and yet, admitting that this is a shortcoming, is it entirely without virtue? And is the routine general abdominal exploration an ideal and universally desirable procedure? How often do we see the upper abdomen explored during the performance of a pelvic laparotomy, and the kidneys, gall bladder and stomach reported normal after a cursory examination with the gloved hand, while the same surgeon after opening the upper abdomen of the next patient, spends many minutes in examining the gall bladder and stomach, perhaps opening the latter in search of an ulcer, and finally depends upon the pathologist for the settlement of a question so blithely decided in the case of patient number one. While I would not decry the use of the blind abdominal exploration to a limited extent, where it is strictly indicated, I think it is as used today too frequently a subterfuge for an incomplete diagnosis. Pelvic pathology, although it may defy an exact diagnosis, should usually be recognized sufficiently from the history, combined with vaginal and rectal examination, to allow one to decide upon the necessity of an operation being performed. In the vast majority of cases, upper abdominal pathology which can be diagnosed by the gloved hand of the operator, will have the classical ear-marks



recorded in a properly written history, a thorough examination plus properly co-ordinated laboratory data. The same is true of lesions of the kidney.

Assuming the truth of the above statements, the question becomes largely one of accurate diagnosis and properly placed incisions. The appendix may be reached from the lower abdominal incision when working under local anesthesia. When the upper abdomen and appendix are under suspicion, the incision may be so placed that the required surgical work may be carried out. During pelvic operations the appendix may be removed without difficulty.

Looking at the subject from this standpoint, this objection to local anesthesia is, it seems to me, not so great as some surgeons would have us believe, for, after all is said and done, it must be admitted that the ideal method of examination is and always must remain the method of direct vision. With a properly prepared abdomen, and a perfect local anesthesia, one may in most cases examine the anterior surface of the stomach, and note the condition of the gall bladder through the pelvic incision by the use of vertical retraction and forced inspiration. Conversely, the pelvic organs may be seen in many instances through the incision in the upper abdomen. We have frequently visualized the stomach, gall bladder and pelvic organs through the gridiron incision for the removal of the appendix. Incidentally, the fact must not be lost sight of that the hand may be introduced into the abdomen of the conscious patient, and digital examination carried out in many instances without marked distress.

*Nausea and Vomiting.* The most objectionable feature encountered in abdominal work under local anesthesia is nausea and vomiting. Usually vomiting is brought about by traction upon some viscus. But here again we know that traction upon the abdominal viscera is one of the most potent shock producers, and it should therefore be eliminated if possible. Under local anesthesia it *must* be eliminated. Whether this is an unalloyed shortcoming, or a virtue, remains to be seen. In work upon the gall bladder, the liver can not be forcefully extracted from the abdominal cavity and laid upon the chest wall. Even under general narcosis this procedure is resented to a marked degree by the

human organism, and in terms which the observing surgeon may easily interpret. By strategy much the same result may be accomplished by carefully "upending" the liver *within* the abdominal cavity, thus rotating it while the gall bladder is projected outward by the inspiratory effort of the patient, and retained in this position. (Fig. No. 1).

All work in the upper abdomen should be preceded if possible by the blocking of the splanchnic system, and one should not hesitate to give general anesthesia in any case which can not be satisfactorily handled under local. Stomach surgery demands the avoidance of traction, and should be done insofar as it is possible, without the use of clamps. The patient can as a rule place the stomach in a favorable position, provided the incision is properly placed. In doing a gastroenterostomy, for instance, it is not necessary to place the hand in the lesser peritoneal cavity and dislocate the stomach in order to force it through the rent in the colic mesentery. A small clip placed at the proper point upon the greater curvative, serves to identify the future anastomotic point, and by its use, the stomach may be "fed" through beneath the colon.

Viscero-parietal adhesions, while considered an obstacle to the use of local anesthesia, are really very satisfactorily dealt with by making use of a negative intra-abdominal pressure and vertical retraction. (Fig. No. 2). Adherent pathology which is beyond the scope of local anesthesia, should at once be relegated to the general narcosis class.

*Caudal Anesthesia.* The use of caudal anesthesia as an adjunct to local anesthesia in surgery of the pelvis, is worthy I believe, of a more extensive trial. We have under its influence, found the pelvic organs entirely insensitive, and allowing the performance of the most extensive procedures, with the greatest satisfaction. Unfortunately, the anesthesia is not constant in its effects, and in attempting its use, about 10 per cent of failures are reported. Also, toxic symptoms seem to be not uncommon, although they are of mild degree. Should further experience render this form of anesthesia certain and constant, it should prove the anesthesia of choice for pelvic work. In prostatic surgery, caudal anesthesia, combined with suprapubic infiltra-

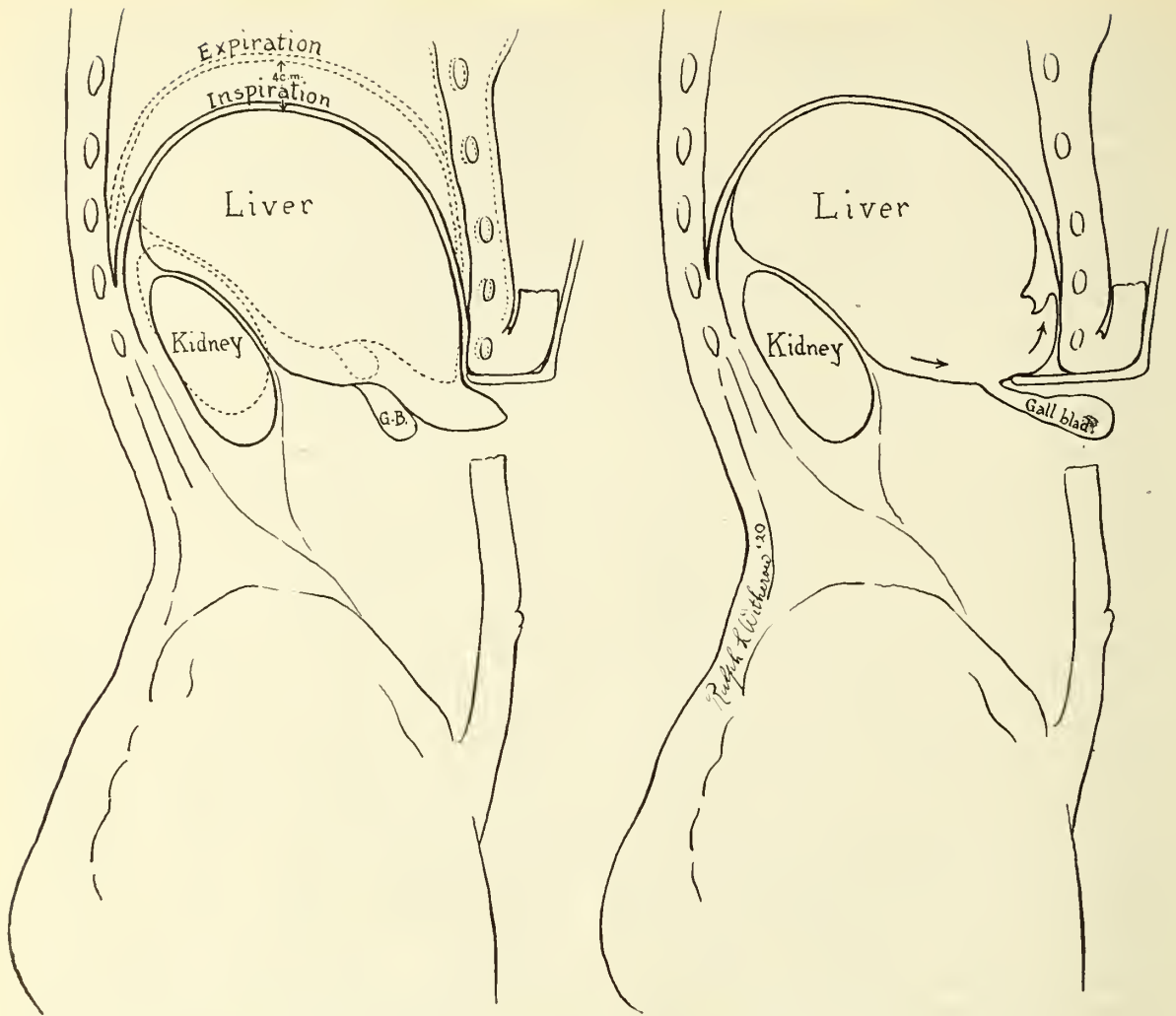


Fig. I. Method of rotating liver within abdomen for exposure of gall-bladder and ducts.

tion, gives one practically 100 per cent perfection. In our last ten cases, the anesthesia was ideal in every instance, and the pulse rate at the end of the operation averaged 75.

*Hardship to the Surgeon.* Another of the so-called disadvantages of local anesthesia, is the hardship imposed upon the surgeon who uses it. The facts are, that it is a much more simple matter, and less wearing upon the surgeon, to operate upon a patient who is deeply narcotized, because many annoying details are eliminated and do not have to be considered. It is not necessary to introduce the anesthetic, necessary and even unnecessary trauma are not resented by the patient, the mastery of a refined technic is not so essential, and the necessity of learning a new or unusual system of procedure is eliminated. In other words, the lines of least resistance

are more readily followed here, as they are in all other fields of endeavor. And yet, provided we take as our standard the maximum benefit to the patient, can we with justice, consider, this point alone as a shortcoming of any method? The same argument applies with equal strength to the development of an aseptic technic, a high degree of efficiency in the nursing staff, or a high degree of development in the diagnostic department of one's clinic. The approach to the ideal is always fraught with hardships to the surgeon. They are entirely relative, and the whole question relates to, whether or not they are worth while, and this point must it seems to me, be made the crux when considering pro and con the hardship to the surgeon.

In considering this hardship to the surgeon, it may be well to reflect upon the fact that the



use of methods to which we are not thoroughly accustomed, and which are not used routinely, always demand a greater outlay of energy, and that practice in the use of these methods brings with it a great reduction in the difficulties to be overcome, and a consequent decrease in the amount of energy necessarily expended.

*Division of Attention.* Many surgeons object to local anesthesia because of the fact that the conscious patient demands, or seems to demand, a certain proportion of their attention, whereas, in the fully narcotized patient, the whole attention may be given to the surgical work. Provided this is to be considered a shortcoming of the method, one must consider all other features which may in any way detract the surgeon's attention from the operation, such as demonstrations of the work being done to visiting physicians, nurses and students, as well as the distraction which is, or always should be present in the mind of the surgeon during the time in which the patient is inhaling general anesthesia. In my experience, a poorly administered general anesthetic, or one that is for any reason unsatisfactory, is far more annoying and more apt to

interfere with the performance of a surgical operation, than is the division of attention found necessary when local anesthesia is used, and I believe that it is less difficult to acquire the habit of dividing attention when local anesthesia is used, than it is to demonstrate to an audience while operating. As a matter of fact, in each instance, a certain amount of training is required, and with most individuals who are competent to do surgery, the method soon becomes automatic. The elimination of the worries over the shortcomings of general narcosis, the realization of the safety of local anesthesia, and the opportunity it gives one to do a more refined grade of surgery, with the additional manifest advantage to the patient easily converts this so-called shortcoming of local anesthesia into an advantage.

*Time.* The element of time may in some cases be worth considering, although, with the benefit to the patient being considered of paramount importance, the time element must be looked upon as more or less insignificant. As a matter of fact, with proper technic and proper equipment, a large percentage of operations may be

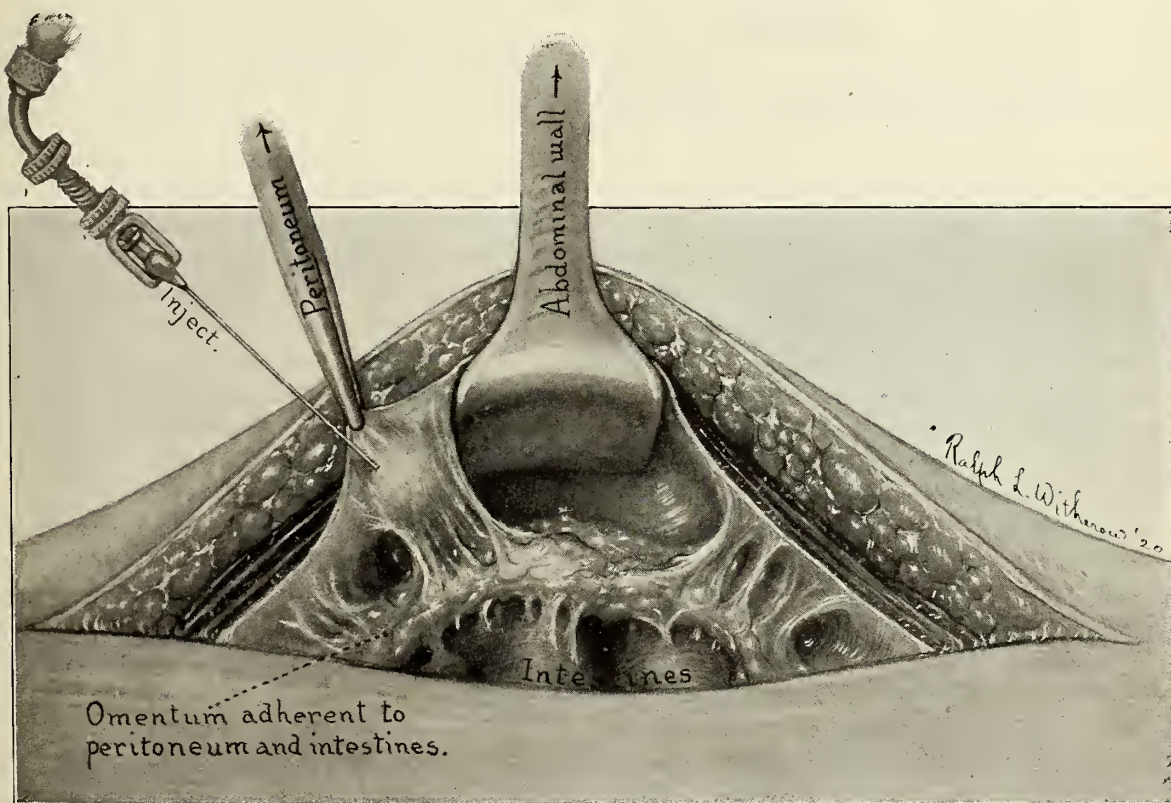


Fig. II. Vertical retraction showing method of handling Viscero Parietal Adhesions under Local Anesthesia.

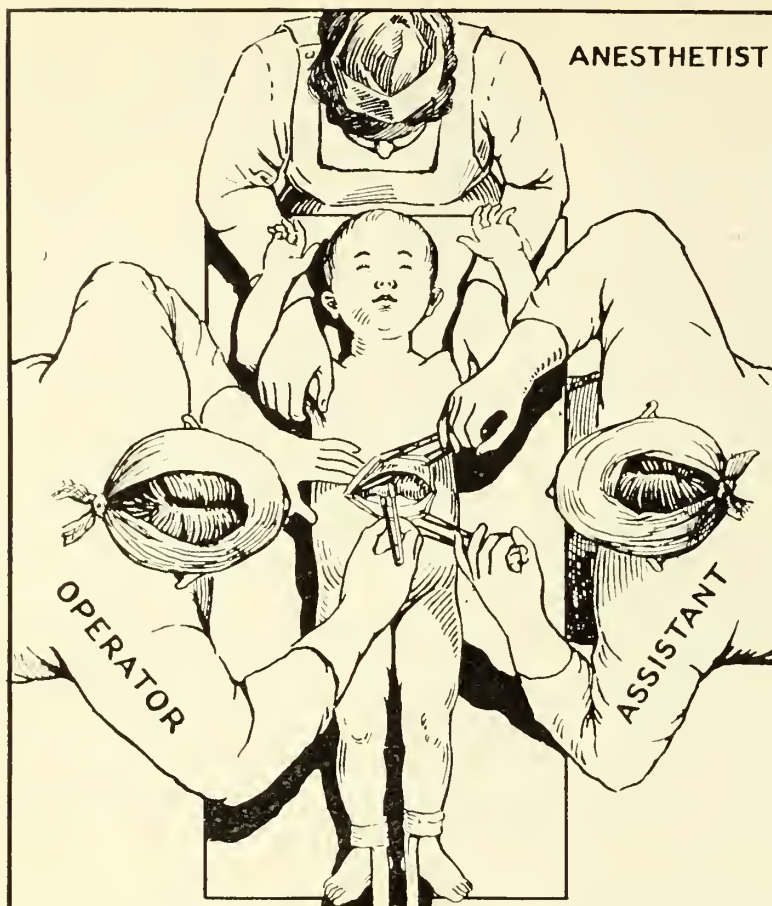


Fig. III. Illustrating the method of controlling young children in operations under local anesthesia. By making traction on the arms, the anesthetist controls the child when necessary.

performed in almost the same time under local as where general anesthesia is used. While the actual performance of an operation may require a somewhat longer time, the combined time of the introduction of the anesthetic, and the performance of an operation, is but slightly different. Local anesthesia can be administered for most operations in less than five minutes, and frequently, only two minutes are required. It is simply a matter of proper equipment and the proper technic. With the pneumatic injector and the direct infiltration, or what I have chosen to call "infiltration-block", the element of time should no longer be considered as a serious shortcoming of local anesthesia.

*Children.* Childhood is commonly accepted as a contraindication for local anesthesia, and most authorities agree that the method has no application to this class of patients. I have found on the contrary, that local anesthesia

presents some of its greatest advantages in the surgery of children. The so-called psychoic manifestations are not to be compared with those manifested when general narcosis is used, and in a comparatively large percentage of children requiring surgery, general anesthesia is a positive menace to life. I refer especially to empyema, intestinal obstruction, hypertrophic pyloric stenosis, etc.

In abdominal work, where local anesthesia is generally thought to be contraindicated, we have found its most satisfactory application. Restraint is required in all cases, but that required during the induction of general narcosis. The method illustrated (Fig. 3), shows a satisfactory means of restraining children while the anesthetic is being introduced. With this method a sterile field may be maintained, as the breaking up of an aseptic technic is the greatest difficulty with which we have to contend.

*Wound Healing.* The interference with wound healing when local anesthesia is used, is mentioned simply because it appears in the literature as one of the shortcomings of local anesthesia. The facts are, that novocain dissolved in Ringer's Solution, and properly sterilized, has not the slightest effect upon wound healing. The fluid introduced is absorbed, and the drug itself is absolutely inert so far as its effect on the tissue cells is concerned.

*Necrosis.* Necrosis of the tissues is reported occasionally in the literature. This should not be charged to local anesthesia when it occurs. It is due to too great concentration of the adrenal solution, combined with too forceful injection into the skin. It is simply an evidence of an improper use of the method.

*After Pain.* Some objectors claim that the amount of after pain is comparatively greater where local anesthesia is used. That this is not



the case has been quite definitely proved by a series of experiments carried on upon living subjects. In bilateral operations where general anesthesia was used, novocain was injected in one wound, while none was used on the opposite side. In no instance was there any difference in the amount of pain complained of. I believe the misconception regarding after pain being greater originated in this way. The patient operated upon under local anesthesia naturally complains more bitterly of pain directly after an operation than does the semi-conscious individual whose nausea and vomiting serve to distract his attention from the seat of operation. The general impression formed by some surgeons that their patients who have been operated upon under local anesthesia have more pain than their other patients can not be taken too seriously on account of the great variation we find in individuals and also because the judgments of surgeons in matters of this kind admits of great possibility of error.

*Conclusions.* In conclusion, let me state that my experience leads me to believe that many of the so-called shortcomings of local anesthesia are more imaginary than real.

That more careful attention to the facts, especially by those of large surgical experience, will eliminate many of the fallacies now extant regarding this art.

And, that training and experience, when sufficiently disseminated, will convert most of the so-called shortcomings into advantage and develop strategic methods of meeting many of the real shortcomings which today confront us.

Discussion appears on page 220.

## THE PRESENT CONCEPT OF LOCAL ANESTHESIA TECHNIQUE\*

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In the selection of a local anesthetic one must be governed by its efficiency and its toxicity. Cocain is generally accepted as the most efficient drug but it is also the most toxic. Novocain is but slightly less efficient than cocain and when properly administered is practically without

danger. In the order of their toxicity the drugs in common use are: Cocain, beta eucain, alypin, stovain, tropococain, novocain. Quinine and urea has not proved highly satisfactory because of its slow action and its slightly painful introduction. Its greatest field of usefulness lies in the prevention of pain following surgical operations, particularly those on the throat and rectum. In solutions stronger than 1-6 per cent, it frequently interferes with primary healing. Saligenin, a discovery of Dr. Hirschfelder of the University of Minnesota, is now being tested out and because of its low toxicity has great possibilities. Aposthesine\* has recently been reported by the National Council of Pharmacy as only slightly less toxic than cocain and less efficient than novocain. Novocain because it is efficient and because it may be used almost ad libitum must be accepted as the local anesthetic of choice.

The toxicity of this type of drugs depends upon the amount absorbed directly into the circulation. Experimentally it is stated: that the lethal dose of cocain, (and that applies generally to this group of drugs) is smallest intravenously, 8 to 10 times greater intraarterially and more than 30 times greater subcutaneously. By introducing a weak solution slowly, intermittently or by controlling its absorption, many times the toxic dose may be given with perfect safety. That concentrated solutions are many times more toxic than weak solutions was demonstrated by Schleich and Reclus. To produce satisfactory anesthesia in major surgery it is absolutely imperative that large quantities be used. Allan reports the use of 38.4 grains with out harmful results, while Babcock has used 12 ounces of 1 per cent (equivalent to 60 grains) and the author has personally seen 19 ounces of 1/2 per cent (equivalent to 45 grains) used by Farr with no untoward symptoms.

The control of absorption besides influencing the toxicity also determines to a large extent the duration of the anesthesia. This may be accomplished by the addition of adrenalin or the use of a tourniquet. Adrenalin also has the distinct advantage of rendering the operative field bloodless. Caution should always be exercised not to use adrenalin in the presence of a terminal circulation such as the finger or the penis because of the danger of gangrene.

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

The most simple method of producing local anesthesia is the infiltration or the odematization of the tissues in and about the site of the operation. However, in many cases, regional methods are to be preferred. By the regional methods, the nerves are blocked proximally to the site of the operation and this is necessarily a more difficult procedure, demanding a thorough knowledge of the nerve supply to the operative field.

Regional anesthesia or nerve blocking includes the following methods: (1) intraneural injections, (2) paraneural injections, (3) spinal analgesia, (4) intravenous injections, (5) intraarterial injections, (6) circumferential infiltration of Hackenbruch, (7) caudal anesthesia.

The paraneural or infiltration block, and the circumferential infiltration of Hackenbruch, are the simplest and the most commonly used. The others are more dangerous and require a certain technique which renders them more difficult. Because they possess no particular advantage I shall not discuss the spinal, intravenous or intraarterial methods.

#### TECHNIQUE

The primary requisite is a number of good syringes preferably of glass or metal that will not leak even under high pressure, together with an assortment of needles, varying from 1 to 4 inches long and in calibre from 18 to 24, which will not become detached during use. The self filling syringes and the Farr Pneumatic Injector possess great advantage over the ordinary syringes and render the injection more simple and more rapid.

For infiltration, infiltration block (paraneural) and caudal anesthesia 5-10 to 7-10 per cent novocain in Ringer's solution (with 3 to 5 minims of adrenalin 1-1000 to the ounce) has proved most satisfactory in our hands, while for intraneural injections we prefer 1 to 2 per cent novocain in Ringer's solution with the same proportions of adrenalin.

#### PRELIMINARY PREPARATION

The preliminary preparation of the patient consists to a large extent of an endeavor to keep him in a good mental state. The patient who enters the hospital the night before is generally given a light supper, and a sufficient amount of sedative to insure him a good night's rest; he

is usually given an enema, but is not purged. He may be shaved and prepared, but not in a brilliantly lighted operating room, which usually causes fright. Hypodermics of morphine and scopolomine may be given preliminary to the operation if nereo-local anesthesia is desired. He is then quietly transported to the operating room with eyes covered, and placed on an operating table with soft pillows, paying particular attention to the comfortable position of the arms and legs. During the operation he is permitted water in small amounts, while candy, milk or a nipple may be given to children and infants. Music is helpful in maintaining a state of mental composure.

#### INFILTRATION ANESTHESIA

After first warning the patient, a very fine needle is introduced and a wheal made in the skin. A second needle of slightly larger calibre 2.5 to 3 inches long is introduced through this wheal into the subcutaneous tissues injecting continuously as the needle advances. It is then run along subcutaneously for 2.5 inches where a second wheal is made in the skin but this time from beneath. Through the second dermal wheal the needle may be introduced painlessly at once. By then introducing the needle vertically through the anesthetized skin, the deeper layers may be infiltrated in the same manner until all the tissues through which the incision is to be made have been odematized. or the ordinary mid-line incision the injection has been made and the abdomen opened painlessly in six minutes.

A most important point in the technique little emphasized, is to always inject with the needle advancing or during its withdrawal but never with the point stationary, because of the danger of an intravenous dose. By keeping the needle moving the necessity for aspiration is eliminated. The infiltration method lends itself particularly to operations upon the abdominal wall. However, because of certain anatomic advantages or the disadvantage of odematous tissues, regional anesthesia may be preferred or a combination of some form of regional and infiltration may be used.

#### INTRA NEURAL INJECTION

One of the best examples of this method is the brachial anesthesia of Kulenkampff. A wheal is made in the skin over the mid point of



the clavicle. With the finger over the subclavian artery, a long fine needle is introduced through the wheal downward, inward and backward, pointing in the direction of the second dorsal spine. Sensation referred to the little and ring fingers indicates the point for injection. Ten c. c. of a 1 or 2 per cent novocain solution is usually sufficient for complete anesthesia of the whole arm. The needle should be introduced unattached to the syringe or if attached aspiration should be attempted to again avoid an intravenous dose. The main objections to this method are that it is not absolutely free from danger and is technically difficult.

#### PARA NEURAL INJECTION OR INFILTRATION BLOCK

By this method the tissues *about* the nerve trunks are odematized. It is a much more simple procedure and very effective, especially when reenforced by subdermal infiltration at the site of incision. By the combined methods the cervical nerves may be anesthetized at their exit by infiltration block, reenforced by subdermal infiltration at the site of operation permitting bloc dissection of the neck, thyroidectomies, laryngeotomies, and so forth, to be done without pain. An infiltration block of the cervicals, together with the upper six thoracic nerves reenforced by subdermal infiltration will permit radical amputation of the breast with dissection of the axilla to be done very satisfactorily. The combined method is also ideal in inguinal hernia, where odematized tissue may interfere with their identification. Here an infiltration is made under the skin along the line of the incision and the ilio-inguinal and iliohypogastric nerves are blocked under the external oblique fascia near the anterior superior spine. The genital branch of the genito-erural nerve is blocked after exposure of the cord.

#### CIRCUMFERENTIAL INFILTRATION OF HACKENBRUCH

By this method the site of operation is circumscribed, blocking the nerves proximally. Almost all texts on local anesthesia recommend the making of several wheals in the skin which are connected subcutaneously. This technique may be greatly improved by making all except the first wheal from beneath and painlessly as described under infiltration anesthesia. Repeated small pricks in the making of skin wheals

frequently forfeits the patients confidence and spells failure for the method.

#### CAUDAL ANESTHESIA

By this method a fairly large needle with obturator is introduced through the terminal sacral canal. The obturator is removed and about 4 ounces of novocain 0.5 per cent with adrenalin are injected. The injection is extradural, the fluid finding its way along the line of cleavage between the dura and spine, bathing the nerves at their exit. The terminal spinal nerves are the ones especially effected but the author has observed anesthesia as high as the nipples. The method has great possibilities but in our experience has not been without untoward symptoms, a fall of blood pressure, sudden paling, and acceleration of the pulse having been observed. The same precautions against intravenous administration must be exercised as in brachial anesthesia. The anesthesia is ideal, permitting any work in the perineum and rectum to be performed and serves as a valuable adjunct in the performance of operations in the pelvis.

#### TRANSVERSE BLOCK OF THE EXTREMITIES

In the case of the extremities a subdermal infiltration<sup>c</sup> may be made completely around the limb. Through this anesthetized ring the needle is introduced at right angles forming a transverse plane of infiltration completely through the extremity, depositing most of the solution in the neighborhood of large nerve trunks. The anesthesia is equally applicable to arm or leg and is complete and safe. It is surely a much safer procedure for the doctor who alone must amputate or reduce a fracture, and give the anesthetic at the same time, in such an unfavorable location as a farm house or in his office. The injection of the anesthetic may be accomplished in from 8 to 10 minutes with a good syringe, following which the surgeon may devote his undivided attention to the operation.

#### LOCAL ANESTHESIA IN ABDOMINAL OPERATIONS

When the anesthesia of the abdominal wall has been complete and the incision entirely painless there will be encountered a negative pressure, an inrush of air, and a falling away of the abdominal contents. This is the ideal to be attained as for instance in a pelvic case without adhesions, in the Trendelenberg position, all intestines will be found in the upper abdomen

and no packs will be needed. Lifting vertically the abdominal wall permits exploration visually of practically any part of the abdomen. We have repeatedly examined both visually and by palpitation the stomach and gall bladder through a lower abdominal incision and the appendix and pelvis through an upper abdominal incision. Tilting the table laterally aids greatly in exposing the organs on one side or the other, similar to the effect produced by the Trendelenberg position.

Adhesions to the parietal peritoneum are very easily cared for under local anesthesia. The abdominal wall is elevated, putting the adhesions on tension so that they may be divided by knife dissection along the white lines, without hemorrhage. Pain is prevented by the injection of the parietal peritonium.

In abdominal surgery under local anesthesia, one must constantly bear in mind certain painful points that must be anesthetized, such as the round and broad ligaments, the ovarian pedicle, the meso-appendix, the mesentery, and the tissues of and about the bile ducts. These should be infiltrated before any attempt is made to handle them. The utmost care must be exercised at all times, which reduces trauma to a minimum and teaches the surgeon the wholesome respect for tissues the final results of which are less post operative vomiting, fewer gas pains and a generally less stormy convalescence.

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Discussion appears on page 220.

## PRESENT STATUS OF THE LOCAL ANESTHESIA PROBLEM\*

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It is the object of this paper to present a few facts relative to the present status of the local anesthesia problem, as compared to general anesthesia. At the present time there is no ideal anesthesia. The lightest anesthetic that is consistent with the best work is the safest.

There are at present no statistics available as to death rate under local anesthesia. Occasionally a case is reported, as death from local anesthesia, from apparently non-toxic substances, such as novocain. Every person knows or should know the toxicity of cocaine, and that it is about as dangerous an anesthetic as could be used in major surgery. A number of deaths have been reported from comparatively minor operations. The death rate from general anesthesia, under ether, has been stated to be 1-10,000, under chloroform 1-3,000, and under gas-oxygen about the same as chloroform, when given by a skilled anesthetist. Statistics recently collected, by Salzer and Stewart give the mortality rate from general anesthesia at 1-600, and I doubt not, but that it is even greater than this, except in well organized clinics, where trained anesthetists are available.

Morris has shown that tests for acetone bodies are present in the urine after ether anesthesia has been administered. With lowered carbon dioxide combining power of blood, there is an increased retention of nitrogen in the blood. It is a well known fact, that, where the carbon dioxide combining power of blood in diabetics is lowered, there is an increased formation or retention of blood sugar. In a series of cases, Short shows the carbon dioxide combining power of the blood to be decreased 4 to 17 per cent under ether, the anesthetic varying in duration from 26 to 70 minutes. The drop is greater from chloroform. Killian has shown that the drop is much less under spinal or gas-oxygen anesthesia. The fact that the mortality rate in surgical diabetics has been reduced from 6 per cent under general to 3+ per cent under local anesthesia, speaks for itself. Another factor

\*Read before the Minnesota State Medical Meeting, St. Paul, October, 1920.





that we must remember is that local anesthesia is resorted to, by the majority of surgeons, only in exceptional cases i. e., diabetes, senility, pulmonary, cardiac or renal complications, rather than as a routine measure.

Preventable deaths from anesthesia may be divided into three groups; (1) those resulting from the anesthetic itself, (2) faulty administration, (3) pathologic and physiologic causes in the patient. Some drugs used for local anesthetics are practically non-toxic, for example novocain and saligenin. Yet there are a few, as will be mentioned by Dr. Maxeiner, that should not be used for major work. Faulty hospital system, or none at all, in regard to the general anesthetic problem, combined with disregard in most of our medical schools for the teaching of one of our most important sciences, is the cause for the second. At the present time, there is only one class. A medical school that has a professor of anesthesia. In a few eastern cities, the hospitals have recognized this failure, and have consultant anesthetists on their staff. These cities have organized societies and associations of anesthetists. Reliable statistics will be ready in the course of a few years. As regards the administration of local anesthesia, it is done, on the whole, with more precision and knowledge on the part of the anesthetist, yet we see attempts at producing local anesthesia, which cannot but result in failure. And even with failure apparent, the surgeon does not use combined anesthesia, but continues to perform the work, subjecting the patient to pain and shock, just as severe or more severe than would have resulted, had a general anesthetic been administered primarily. General anesthesia may be the choice in well organized clinics, where trained anesthetists are available, where functional state, i. e., cardiac reserve, renal function, metabolism and so forth, has been well determined. It is not the well organized clinics that have a high death rate from anesthesia, but it is in the smaller cities, rural districts or the hospitals, where the system is at fault and no trained anesthetists is available.

There are a few requirements necessary to the successful performance of the work.

1. Careful attention to essential details. These can be learned from any text book, but

unless known, will mean failure the first time and "as a rule not a second attempt."

2. Less manipulation of the tissues and this means better technique. Exploration is made more by visual examination, than by digital. If digital examination is necessary, combined anesthesia may be used, provided it cannot successfully be made under local. This does not require the stage of surgical anesthesia, but the stage of analgesia is sufficient. The surgeon should know the limitations and not subject any patient to pain, for shock can be produced from pain in this manner, just as easily as from any added trauma or anesthesia.

3. Cooperation of the patient and surgeon, combined with preoperative cooperation of nurses and attendants. Suggestive remarks at time of admittance may destroy the confidence of the patient. This applies equally well to any procedure that transpires in the surgical amphitheatre. Suggestive remarks by attendants or friends such as "are you having pain," creates an impression which may lead to loss of mental control.

4. In regional blocking knowledge of anatomy is essential.

5. In abdominal work, vertical retraction combined with a position of patient so as to get negative abdominal pressure so essential to a successful visual examination, should be used. Digital examination can be made, provided no tension or traction is made upon mesentery. The visceral peritoneum is not sensitive to pain, as far as we know, except in acute or subacute inflammatory conditions, but any manipulation of the parietal peritoneum will cause pain. The parietal peritoneum is very sensitive. Packing can be used if properly performed, but in a majority of cases, it is only necessary to prevent soiling of the field.

There are disadvantages which we hope will be met, as our knowledge of this subject increases. Psychic and time elements will be taken up by Dr. Farr. As to the increased risk of infection, this is still unproved. It is my personal impression that, giving attention to details, there will be no more infections than under general anesthesia. In my service at the General Hospital No. 26, where all wounds with any suspicious looking material were cultured, there was a smaller percentage of infections on my

service, than on any clean service. In these cases either infiltration anesthesia, or local with regional blocking or with gas-oxygen, was used. There was only one pulmonary complication, in a series of about 150 nerve operations. This followed separation of a pedicle flap, three weeks after neurolysis of an ulnar and median nerve injury of the forearm and this complication developed following diphtheria. Disadvantages, such as adhesions in the posterior parietal peritoneum, and malignant conditions in this location, can at times be met successfully. Where this cannot be accomplished, it is much better to give either ether or gas-oxygen combined with local infiltration, provided, it cannot be satisfactorily performed by associated caudal injection. Post-operative local complications which consist of reactionary hemorrhage and serum discharge of the wound, give little or no trouble if all bleeding vessels are tied, and loose suture of wound is practiced. General postoperative conditions such as insomnia and pain are less than under general anesthesia when work is successfully done. When pelvic work has been performed there is retention of urine in a larger number of cases. In absence of infection, distension, nausea, vomiting and ileus do not result nearly so often, providing satisfactory anesthesia has been present and no traction has been made upon mesentery. I rather think that in a number of cases when nausea is present, it is a result of the pre-operative administration of narcotics. If the patient is subjected to pain during operative administration, this will be worse. Jaundice, which is often mentioned, has been noted in comparatively few cases of my own.

A few advantages in regard to surgery of the different parts may be mentioned. With the head and neck, you have the cooperation of the patient in aiding to hold the head in most advantageous position, for the best work. The engorgement of vessels that is so often seen under general anesthesia is not present. Postoperatively, there is not the danger of loosening up dressings from vomiting in straining, and soiling of the wound from vomitus. Nourishment can be taken at once if necessary. I have not yet seen permanent injury of the recurrent laryngeal nerve in a single goitre that has been performed under local anesthesia. With thoracic

surgery, the patient can be given nourishment at once and there is not the danger of stirring up an acute respiratory complication. This may also be stated in regard to an already present pulmonary lesion, in regard to surgery of any part. Abdominal work gives the operator a chance to make a visual examination, and in some obscure pathologic condition, he can, with aid of the patient, locate the exact point of the lesion, by producing the same pain that the patient has been suffering from. Work on the extremities is most satisfactory. Fractures can be reduced either by regional blocking or infiltration blocking. For infections of the hand, it is the ideal anesthetic. The practitioner can carry in a hand bag sufficient material necessary to do work on the extremities such as mentioned. A package consisting of sterilized novocain, needles, syringe and field towels, is sufficient to reduce the average fracture in the country.

#### CONCLUSIONS

1. There are requisites necessary which must be learned before success in this work will be obtained.
2. The subject of anesthesia, local as well as general, should be given more attention in our medical schools.
3. Postoperative complications are fewer, and recovery is better in a shorter length of time.
4. Disadvantages are more unreal than real.
5. The patient aids in preventing any unnecessary trauma.
6. The mortality rate can be reduced as evident by the reduction of the mortality rate in surgical diabetics.
7. And finally upon the enthusiasm of the surgeon and increasing knowledge of the subject, rests the future of local anesthesia and the widening of its field of usefulness.

#### DISCUSSION

(Discussion on papers of Drs. Farr, Bratrud and Maxe'ner)

DR. L. E. DAUGHERTY, St. Paul: We have found a constantly increasing field for the use of local anesthesia. Not only that, we have found that the people are coming to us demanding local anesthesia. Especially is this true of those who have taken a general anesthetic. I think this is due to the educational propaganda carried on by Dr. Farr and his associates and by their work.

There are some things we cannot do under local



anesthesia and some things we do not want to do. For instance, in abdominal work, as Dr. Farr said, when you put traction on the mesentery it invariably produces vomiting and distress.

After local anesthesia, I am convinced that a great amount of postoperative vomiting is due to the narcotic given before the local anesthetic. We have had very little postoperative vomiting due to local anesthetic except in those cases where we have used morphine.

The element of time it seems to me is hardly to be considered. As Dr. Farr said, we can use a local anesthetic and it does not take any more time than a general anesthetic. In a great many cases it does not take as much and if we consider the welfare of the patient as paramount, time should not be considered.

The use of local anesthesia in childhood it seems to me is the crucial test. We have repeatedly operated on children from 4 to 14 years of age under local anesthesia. Following the recent "flu" epidemic when we had so many cases of empyema I have often opened the chest cavity with the child sitting on the edge of the table in cases where we could not give a general anesthetic. The after pain has been less in our experience. We have not had these children complaining of pain after local anesthesia. It seems to me the severest critics of local anesthesia today are those who will not use local anesthesia, or those who cannot use it successfully.

DR. G. L. LABAT, Paris: I was not prepared, of course, to take part in the discussion, but I am very glad to say that I have been invited by Dr. Mayo to attend this most important meeting. I will say just what my experience has taught me in regard to this important subject.

I have heard Dr. Farr and others speak of the general methods, present status and present concept of local anesthesia. Of course, I have nothing to add regarding the technic, nothing to add regarding the psychic element in connection with local anesthesia, except that the psychic element can certainly be done away with by a little scopolamin and morphin. I have just heard about scopolamin and morphin, at least morphin, creating disturbances of nausea and vomiting in the preoperative and postoperative periods. The little experience I have had with scopolamin and morphin has shown that each time we have done away with the psychic element. We give at least an hour before the anesthetic is given a dose of morphin and scopolamin. A small dose acts as an excitant but very often a larger dose acts also as an excitant, but in my opinion I do not think that scopolamin and morphin has anything to do with the vomiting. Certainly in abdominal surgery tractions which are made on the mesentery, and especially in gastric surgery where pressure is made on the cardiac wall of the stomach, have a certain reflex effect on the splanchnic nerve supply and I think that causes the vomiting. While I am on the splanchnic nerve supply I will tell you

the experience we had some time ago in connection with abdominal surgery and splanchnic analgesia. It is, as all you gentlemen know, very difficult to operate on the abdominal organs with local anesthesia, because, as we all know, the parietal peritoneum is very sensitive. Traction on the parietal peritoneum causes a certain disturbance if not a real discomfort. It is the retroperitoneal tissue, chiefly supplied with cerebrospinal nerves that is affected when traction is made on the parietal peritoneum. We have 50 cases of gastro-intestinal surgery operated under local anesthesia. In these cases, after infiltrating the abdominal wall, we infiltrated the splanchnic nerves. At the junction of the splanchnic nerve with the semilunar ganglion the needle was inserted. We brought the needle through from the back on each side of the spine until we reached the retroperitoneal tissue and there we injected a certain quantity of novocain-adrenalin solution, 1 per cent novocain with adrenalin for each 100 c.c. of the solution. In the 50 cases thus infiltrated we obtained 48 good results. The purpose was not to anesthetize the splanchnic nerves, because this, we are of the opinion, can produce certain pathologic conditions of the splanchnic nerves, but to infiltrate the retroperitoneal tissues so as to allow us to make traction on the mesentery and on the stomach without causing any pain to the patient. We succeeded by infiltrating 25 to 30 c.c. of a 1 per cent novocain solution into the retroperitoneal tissues by a special technic, in doing our stomach operations. We have also done gall bladder operations that way. In two instances we injected just at the level of the twelfth rib, four fingers distant from the middle line on the spine, directing the needle at an angle of 45 degrees with the median plane of the body until it reached the body of the first lumbar vertebra and as soon as the needle went on gliding along the body of the vertebra, we went in 1 cm. farther and then injected the solution. Our technic certainly in these two instances must have been at fault because the solution instead of running into the retroperitoneal tissues so as to infiltrate them went somewhere else, with the result that the lower limbs were partly anesthetized. That was at the beginning of our experience. We know now that all operations on the stomach and even, I may say, on the upper abdomen, can be made by regional anesthesia. It is a kind of a paravertebral anesthesia. It is not the regular method; it is a new method we have been trying and have succeeded in using.

DR. GEORGE EARL, St. Paul: I was interested to find out just how much we are using local anesthesia. In 1918 in major abdominal surgery we did one operation out of thirty under local anesthesia. In 1919 the ratio had increased to one in seventeen, and this year, 1920, during the first eight months up to September 1, I find, on going over the statistics at the Mounds Park Sanitarium, that we are doing one in three. In less than three years our ratio has increased from 1 in 30 to 1 in 3. We have

made no insistent effort to use local anesthesia. Often patients decide for themselves. We have come to use local anesthesia because we found no increased infection; the after-effects have been lessened; the recoveries have been more rapid, and in general we have felt there has been less surgical risk.

I think we have all been impressed thru these papers that, after all, it is not the drug that is used—novocain is used because it is less toxic—but it is the effort these men put forth; i. e., the scientific handling of the patient from the time he enters the hospital until the operation. The moral anesthetist that is always present plays an important role in the success of local anesthesia. As to preliminary narcotics, I believe that a good hypnotic might bring the patient to the first stage of a twilight sleep and thus simplify the use of the local anesthetic. We do not approach an operation under local with the feeling that we are going to insist absolutely on its use alone. We tell the patient that if it hurts, we will give him a little gas. A competent anesthetist is always present ready to administer it at a moment's notice. Possibly most men attempt too much to begin with.

In goiter work, our technic consists in infiltrating the line of incision and from this upward a sufficient distance to cover the area that the flap is to be retracted. At the same time the muscles are infiltrated slightly and the incision is immediately made. Usually we can then proceed to the vertical incision over the muscles covering the thyroid, and if necessary, make a lateral incision over the thyroid without further infiltration. The goiter is then exposed. We infiltrate the two superior poles. We have found in most cases that the sensitive point is at the superior poles and the trachea adjacent. By injecting these areas we have succeeded usually in securing a satisfactory anesthesia. I think we have reduced the time for operating in goiter because the tissues are more visible and we are not dealing with a great many problems of general anesthesia. We have not used special vertebral technic in laparotomies either, but have almost entirely confined ourselves to infiltration.

DR. J. A. EVERT, Brainerd: I was very much interested in hearing Dr. Maxeiner say that he is using nerve block anesthesia in the repair of hernia. We have seen in our clinic recently a few recurrent hernias that have been operated on by men in our district with local anesthesia. Due partly I think to Dr. Farr's good work, a great many surgeons have tried to emulate this work in the state and are using infiltration anesthesia especially in the repair of hernias and are getting recurrences. This probably is due to the fact that they are so anxious to handle the tissues gently that they do not do the radical operation the case demands, in many cases not even displacing the cord, and the hernia comes

back. Unless we can do this operation correctly with nerve blocking we should stick to the general anesthetic.

DR. R. E. FARR, Minneapolis (closing): I wish to thank Dr. Labete and the other gentlemen who have discussed the papers.

Dr. Evert states that hernias operated upon under local anesthesia return because surgeons fail to perform these operations properly under this form of anesthesia. I hope that I am no more to blame for some things that I am blamed for, than local anesthesia is to blame for the recurrence of these hernias. We do the Torek operation, which makes it necessary to make a full dissection of the parts, going well into the abdominal cavity. Men who can not produce anesthesia sufficiently satisfactorily for this work should use general anesthesia. They should place the blame where it belongs.

Regarding sedatives, we are still undecided but I believe they are desirable from the psychic standpoint as well as from the standpoint of comfort. Without preliminary hypodermics M. L. Harris has reduced his vomiting to 4 per cent. Our percentage of vomiting is much higher than this, either with or without sedatives. A light Twilight Sleep combined with local anesthesia gives us, I believe, the most ideal anesthesia yet presented, both from the standpoint of the patient and that of the surgeon. However, if we use this form of anesthesia it should be properly labeled as "narco-local anesthesia" and not "local anesthesia".

The splanchnic nerve anesthesia mentioned by Dr. Labete, and which I have mentioned in my paper, has, I believe, great possibilities. At present the technic of reaching the splanchnic nerve is difficult. We have tried it in 150 cases, often going through the liver, after the abdomen was opened. Kappis and Braun have done a good deal of this work and reports satisfactory results. To reach the nerve from behind one must travel a great distance and, while we have tried on the cadaver to work up a method, the distance is so great that we have not been able to establish a satisfactory technic.

DR. A. F. BRATRUD, Minneapolis (closing): I just want to say a word about the peritoneum. In a case where there is any inflammation in the peritoneum, especially of the viscera, you must not handle visceral organs. You can handle them provided there is not much inflammation.

I have injected the cystic duct in some gall-bladder cases because I find you can retract the liver quite well.

I would like to ask Dr. Labat if he had any vomiting or distress after injecting the splanchnic nerves.

DR. G. L. LABAT, Paris: In a few cases we had just a little vomiting and distress, but I thought it was due to an error in technic for later on in our last 45 cases we had no untoward effects.



# DELAYED UNION AND NONUNION OF THE RADIUS AND ULNA\*

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To the surgeon interested in the problems of reconstruction surgery come a large number of persons who have had injuries to the forearm with delayed union or nonunion in either or both the radius and ulna. Complications other than delayed union and nonunion, such as deformity, infection, comminution, loss of bone substance, muscle degeneration, stiffness in neighboring joints, bone atrophy, impaired blood supply, and general constitutional disease, further tax the ability of the surgeon to restore function. With the full cooperation of the patient and sufficient time, the surgeon has means at his disposal by which he may solve most of the problems complicating impaired union. While the failure of some fractures to unite may be due to faulty reduction and incomplete fixation, the interposition of periosteal structures, necrosis, loss of bone substance, and impaired blood and nerve supply, there is a group in which neither syphilis nor any of the foregoing factors appear, but in which the process of ossification ceases before union is complete.

Fifty-nine patients with delayed union or nonunion were observed in the Mayo Clinic from May, 1913, to June, 1920; the average length of time since fracture was more than fifteen months. The Wassermann tests made on the blood of thirty patients were negative. Two patients gave a history of syphilis, but had negative Wassermann reactions and the clinical evidence did not indicate the presence of the disease. Imperfect reduction, inadequate fixation, and too early use appeared to be the principal causes in the group of cases of delayed union and nonunion of the forearm. Many of the patients had been treated by means of splints extending only a few inches beyond the fractures, and even if the fractures had been properly reduced, the slightest motion allowed the fragments to slip by because of the inadequate fixation. In order properly to hold the reduced fractures with

splints, it is necessary to carry the fixation beyond the elbow and beyond the wrist. The suspension, traction and counter-traction method of treating fractures has many advantages, since it allows reduction with free circulation and motion in the neighboring joints, while the tension of the muscles tends to act as splints and hold the fractured ends in a position. If immediate reduction were procured and maintained for a sufficient length of time, without interference of circulation, nonunion would be even less rare than it is at present. In civil practice properly employed splints and plaster as a means of fixation give eminent satisfaction and will continue to be used in injuries of the upper extremities.

Roentgenographic examination of all fractures is advisable before reduction and should be made in the form of a permanent record, plate, or print. A similar record should be made immediately after reduction and at regular intervals until the patient is dismissed from observation. When the fracture has been reduced and immobilized, roentgenographic records and notes should be made concerning the circulation during the treatment; thus the surgeon will have evidence of great value should the question of the responsibility for nonunion, or other complications, arise.

The time of immobilization varies with the patient and the type of fracture. When the average period of fixation has expired and examination still shows motion, delayed union occurs and further fixation is required; nonunion results when the usual measures have been tried for a longer period and motion remains at the site of fracture. If it persists, a pseudo-arthritis usually results with fibrous union, and the ends of the bone often grow outward and form claw-like ends, when they are close together, or long tapering ends, when they are widely separated. In the long standing cases the medullary cavity is closed at the fractured ends by hard cortical-like bone. It is difficult to set a time limit on when delayed union becomes nonunion. The committee on fractures of the American Surgical Association found the average period of disability in fractures of the shaft of the bones of the forearm to be ten and eight-tenths weeks. Delayed union may, therefore, occur after three months, and if the fracture remains united after a similar length of time, it may be considered to be

\*Presented before the Southern Minnesota Medical Association, Mankato, November, 1920.

nonunion, even though fibrous union has occurred.

The cases considered to be nonunion in this report are fractures of the radius and ulna which have failed to become firm within six months. While the disability may persist ten and eight-tenths weeks, practice demonstrates firm union in many instances in half that time and statistics with regard to the time required vary with the accuracy of the reduction and the type and perfection of the fixation, and so forth. In our practice, the duration of fixation is based on the roentgenographic and clinical findings, and no definite prognosis of the time to be devoted to splints is given. This is especially true in the cases of bone graft in which extreme care must be taken.

In the Mayo Clinic patients presenting delayed union or nonunion of the bones of the forearm are submitted to a complete history taking, clinical examination, urinalysis, and Wassermann test. If splints are worn and permit of roentgenographic examination, two plates are taken at right angles to show the extremity. Usually the patient comes without fixation and with some obvious deformity and nonunion. Should the history of clinical findings suggest the possibility that syphilis is a possible factor, the patient is given a provocative test and the opinion of a syphilologist obtained even though the Wassermann test is negative. If more than six months has elapsed since the fracture nonunion is diagnosed; if less time has elapsed, delayed union is diagnosed. If nonunion is diagnosed, the contra-indications to operation must be considered. Should infection be present a preliminary operation is performed; sequestra or Lane plates are removed and after excision of the scar tissue the wound may be allowed to granulate from the bottom, or secondary suture performed. If there is a bone abscess the cavity should be curetted thoroughly, and dished, and the wound packed or Dakinized. Any deformity which may be corrected by manipulation or without undue injury to uninfected tissue should be attended to and the arm splinted in a manner to allow dressings. Union may occur without further interference in a small percentage of cases; in the remainder operation is deferred until healing has occurred and all evidence of dormant infection has disappeared. It is best to

loosen up neighboring joints, improve the blood supply, and overcome the bone atrophy in all cases so complicated before performing an operation for nonunion. The general health of the patient is also of importance in obtaining satisfactory results and special attention should be paid to those who are anemic and undernourished.

#### OPERATION

The technic of the bone graft operation has been discussed by various writers with different opinions on the subject. Our experience has led us to favor the massive graft held by beef-bone screws, and external fixation by plaster of Paris casts. Care must be taken to correct deformity: if necessary, bone is sacrificed to prevent undue strain on the transplant. These massive grafts, with medullary bone containing the preponderance of bone-forming cells (osteoblasts) are easily obtained in any shape and size from the flat internal surface of the tibia. By removing half the transverse section of the fractured bone ends for a distance of 2 or 3 inches and holding the graft firmly with four beef-bone screws, a strong well fitted transplant may be inserted. The graft should be of good size, preferably larger in cross section than the excised half of the bone operated on (Fig. 1, g). Thus a strong splint remains, first uniting at the points of approximation, where living cells of both graft and fractured ends exist, and, if absorption takes place, new bone forms a bridge before the graft is weakened, and the danger of fracture is past. Grafts have been observed apparently united and patients have been assured of good results which ended in refracture and disappointment because small grafts had become weak and gave way on removal of fixation. Splints should be maintained until roentgenographic evidence proves that strong osseous tissue has formed and then the graft should be subjected to careful increasing use so that it may grow in size and strength equal to the strain required for function. On several occasions I have seen bone grafts give way due to the sudden removal of fixation and too great strain. Fortunately the fractured grafts may throw out a callus and unite if fixation is again resorted to. If it is possible to overlap the ununited fragments and apply a bone graft, the results will invariably be improved (Fig. 1 e, f). In all cases the medul-



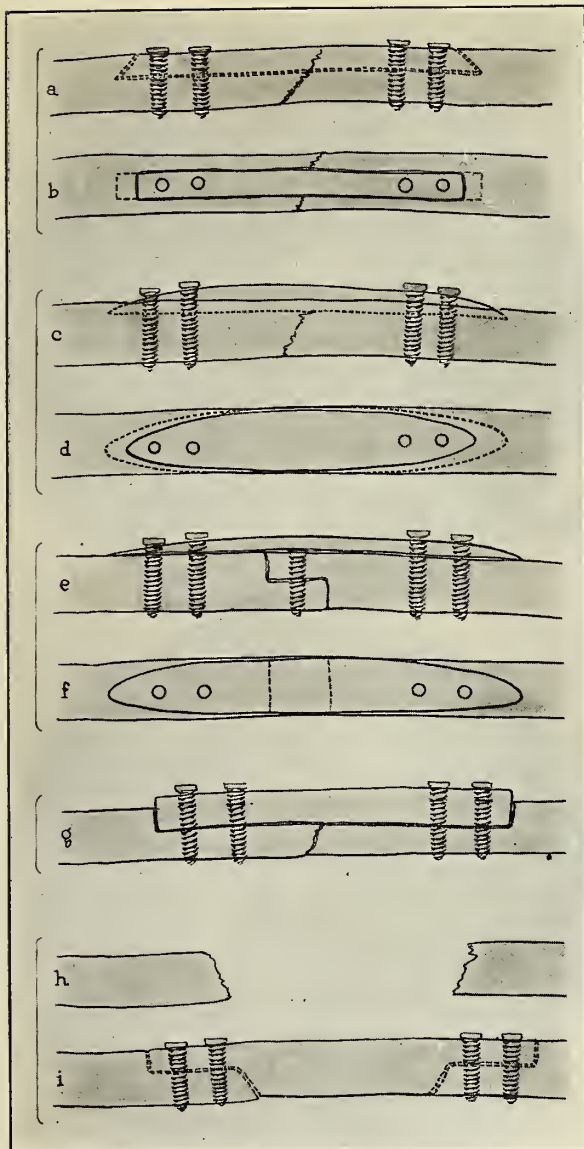


Fig. 1. a and b. The inlay autogenous graft, held by four beef-bone screws. c and d. Beef-bone plate applied and held with four beef-bone screws. e and f. The use of five beef-bone screws, the bone fragments stepped or overlapping; a screw passes through this overlapping portion and gives a broader approximation. g. Massive autogenous graft held with four beef-bone screws; a satisfactory method giving a large percentage of favorable results. h and i. Method of bridging the separated fragments with an autogenous graft from the fibula held by four beef-bone screws.

lary substance should be opened by a drill or an instrument such as the Murphy reamer. Light massage and careful exercise on removal of splints aid in improving circulation and loosening stiffened parts and are advised routinely. The splints may be removed during the day and

applied at night in order to prevent injury during sleep.

#### NONUNION IN THE RADIUS AND ULNA

(Mayo Clinic, May, 1913, to June, 1920)

|  |    |
|--|----|
| Patients (54 males, 5 females).....  | 59 |
| Patients operated on for nonunion before examination at the Clinic (one had had seven operations), (54.4 percent)..... | 32 |
| Average age (oldest patient 78, youngest patient 8), years.....  | 33 |
| Average time since fracture, months.....   | 15 |
| Longest time since fracture, years.....  | 19 |
| SITE OF DELAYED NONUNION   |    |
| Radius and ulna (right 28, left 19) .....  | 47 |
| Radius (right 5, left 3) .....   | 8  |
| Ulna (right 1, left 3) .....   | 4  |

#### OPERATIONS

|  |    |
|--|----|
| Lane plate .....   | 6  |
| Bone graft .....   | 31 |
| Removal of Lane plate (three plates applied at Clinic) ..... | 8  |
| Drainage for infection .....                                 | 10 |
| Sequestrectomy, manipulation and so forth.....               | 4  |

#### BONE-GRAFT OPERATIONS

|   |      |
|---|------|
| Patients (29 males, 2 females) .....              | 31   |
| Average duration of nonunion (months).....        | 22.2 |
| Nonunion in radius and ulna (right 7, left 3).... | 10   |
| Good union .....                                  | 4    |
| Improvement (ulna only united).....               | 2    |
| Failure .....                                     | 1    |
| Information not obtained .....                    | 3    |
| Nonunion in radius (right 10, left 8).....        | 18   |
| Good union .....                                  | 13   |
| Improvement .....                                 | 1    |
| Failure .....                                     | 1    |
| Information not obtained .....                    | 3    |
| Nonunion in ulna (right 1, left 2).....           | 3    |
| Good union .....                                  | 1    |
| Information not obtained .....                    | 1    |

#### RESULTS OF OPERATIONS

|  |    |
|--|----|
| Patients from whom information has been received .....               | 34 |
| Good union .....   | 25 |
| Failures .....   | 7  |
| Improvement .....  | 2  |
| Patients whose operations are too recent to include in results ..... | 7  |
| Patients from whom information could not be obtained .....           | 18 |

#### REPORT OF CASES

*Case 182430.* Mr. A. E., aged 44, came to the Clinic January 8, 1917, because of nonunion of the right radius and ulna of nineteen years' duration. The patient stated that the bones never felt strong following the fracture and he believes that there was no union at the end of three years. Two years before he had had the bone ends sawed off and held with catgut sutures. No benefit was obtained. Four months later an inlay bone graft was used without any benefit.

Our examination showed the nonunion in the right radius and ulna and malposition. The Wassermann test was negative. January 18, 1917, a bone graft from the left tibia was removed and used; the radius was held by a combined intramedullary graft, the graft being driven down into the lower fragments

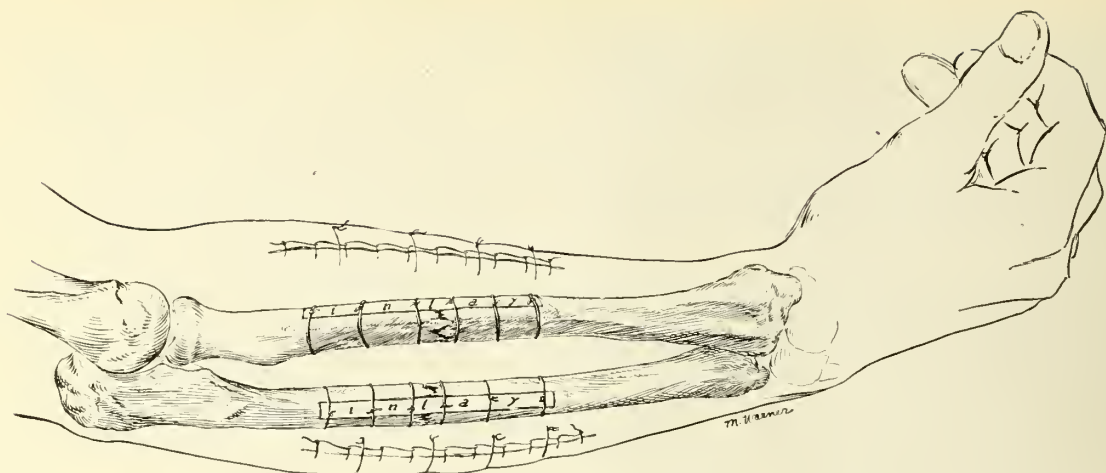


Fig. 2. A method of inserting the inlay graft, the or four threads of catgut are passed around to Fixation is obtained by separating the fragments, inserting the graft, and then allowing the muscle pull to hold the graft firmly in position. Three ends of which taper off into the medullary canal. help hold the graft.



Figs. 3 and 4. (Case 182430). Nonunion of the right radius and ulna of nineteen years duration. Before and after operation.

and used as an inlay in the upper fragments. The upper end of the graft was fitted in the cortex so as to hold it firmly in place. The ulna was treated in a similar manner and chromic catgut was used to aid in holding the fragments. A plaster of Paris cast was applied. An iron screw was removed from the radius during the operation; no record of when it had been applied could be obtained from the patient. A good result followed the operation. The union in the radius was firm, and when the patient was dismissed the ulna was also firm. Three years later he wrote stating the radius was firm but he thought that there was slight motion in the ulna. The functional result of the forearm is good. (Figs. 2, 3, and 4).

*Case 220901.* Mr. S. K., aged 30, was examined February 1, 1918, for ununited fracture of the right humerus and radius and ulna. Fifteen months previously his arm had been caught in the crank shaft of an engine, with a fracture of the right humerus at the juncture of the lower and middle thirds and the radius and ulna in the middle third. The fracture had been set and a plaster of Paris cast applied for three weeks with the arm at right angles; this was followed by splints. Because of malposition and questionable union the arm was refractured and realigned in the third month and again in the tenth month following the injury, without result.

Our examination showed nonunion of the right radius, right ulna, and right humerus. The ulna was



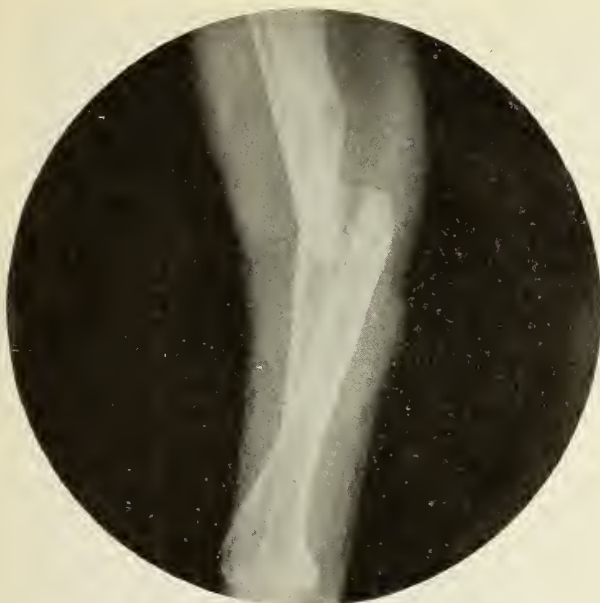


Fig. 5. (Case 220901). X-ray before operation showing malposition and nonunion of humerus, radius and ulna.

well aligned, the radius was overlapping and some callous formation and overriding of the humerus were shown in the roentgenogram. The medullary canal was filled in with hard bone at the sites of fracture. The arm was held midway between pronation and supination, and the elbow at an angle of 100 degrees. February 7, 1918, we exposed the ends of the radius, freshened them, reamed out the medullary cavity and placed a beef-bone screw in the medulla to hold the bone fragments in alignment. The bone screw failed to hold and the graft slipped, and three



Fig. 6 (Case 220901). Firm union of the humerus, radius and ulna following bone graft to radius and fixation with plaster cast six months.

weeks later a second operation was performed. An autogenous graft was inserted and held in place by six circular catgut ties. The arm was maintained in plaster for six months, and firm union in the radius, ulna, and humerus was demonstrated clinically and by x-ray. The functional result was good. (Figs. 5 and 6.)

*Case 255584.* Mr. H. L. D., aged 35, came to the Clinic for examination January 8, 1919. Fifteen weeks previously he had been caught in a sprocket wheel and pulled underneath a machine, sustaining a compound fracture of the right radius at the juncture of the lower and middle thirds. The wound drained for four weeks, during which time dressings and splints were applied.

Our examination showed delayed union, malposition, and no supination; the hand was held in pronation. It was obvious that if union should occur, function would be impaired. The fractured ends were filled in with hard bone, and the radius shortened; the lower fragment lay against the ulna.

The fracture was realigned and the fractured ends of the bone were freshened so as to open the medullary canal. A large autogenous graft from the flat internal surface of the left tibia was applied side-to-side and held in place by four beef-bone screws. Firm union with good function resulted (Figs. 7, 8, and 9).

#### CONCLUSIONS

1. The massive bone transplant has given the most satisfactory results and may be held firmly by means of beef-bone screws.

2. The flat internal surface of the tibia supplies a graft of almost any required size and

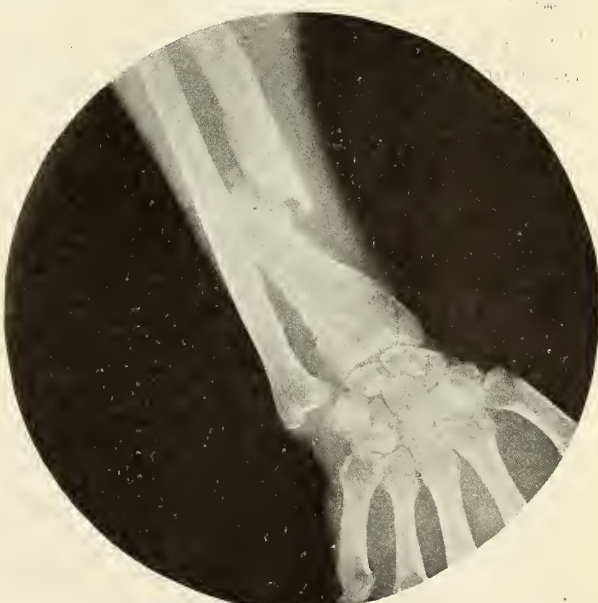


Fig. 7 (Case 255584). Delayed union of the radius of fifteen weeks' duration with malposition and obliteration of the medulla at the site of the fracture.



Figs. 8 and 9 (Case 255584). Radius shown in Figure 7, twenty-two weeks later: firm union; beef-bone screws still visible. Note the periosteal tag between the radius and ulna casting a shadow due to bone growth.

shape, and with medullary bone rich in osteoblasts allows a wide approximation which insures early union.

3. Fixation by a plaster of Paris cast from the fingers to the mid-humerus is a satisfactory method.

4. Fixation should be maintained until firm union and a strong bridge of bone are demonstrated.

5. The arm should be used gradually on removal of fixation, as the graft fractures when it is subjected to sudden and too great stress.

6. Fractured grafts may reunite when given further fixation.

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#### SURGICAL TUBERCULOSIS IN CHILDREN\*

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Surgical tuberculosis in children, that is tuberculosis of the bones and joints, is a subject that it will be impossible to more than touch upon in a single paper. Many volumes have been published dealing with these conditions and numerous articles are appearing constantly which discuss one or more of the many subdivisions. I shall endeavor, however, to cover briefly the general field, emphasizing a few important points and giving more in detail the management of such cases at the Minnesota State Hospital for Indigent Crippled and Deformed Children, in St. Paul. The necessity for such a hospital will also be dwelt upon.

It is generally recognized that both the human and bovine types of tubercle bacilli may infect children, but the proportion of one to the other apparently varies greatly, and for a simple reason. The bovine bacilli undoubtedly gain entrance to the human body mainly through the ingestion of infected milk, that is milk from tuberculous cows. In countries where the milk

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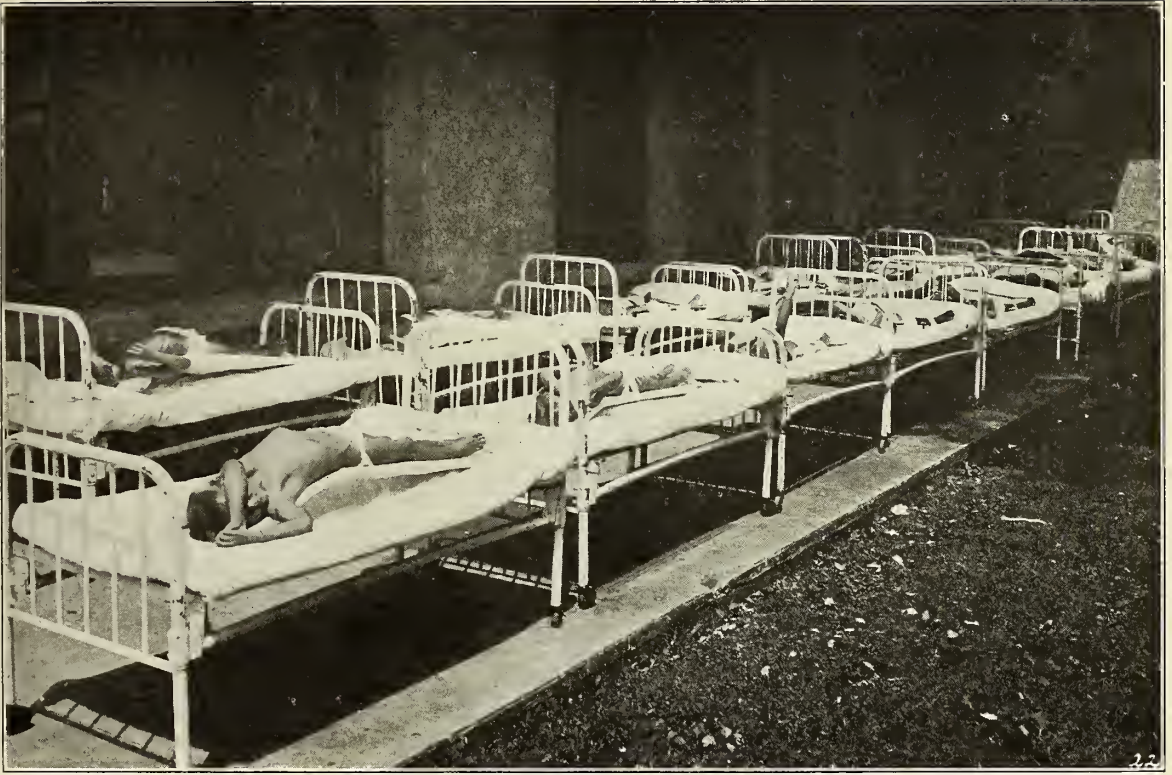


Fig. 1

supply is not so carefully guarded as in ours the incidence of the bovine type of infection is very high, while with us it is probably so low as to be almost negligible. The bacilli, either type, gain entrance to the body chiefly through the digestive and respiratory tracts, the mesenteric, bronchial, and cervical glands becoming primarily infected. From these points they may be carried to any part of the body by the blood stream and there cause active disease. The less common portals of entry are the tonsils, mucous membrane of the pharynx, infected roots of teeth, the skin and genito-urinary tracts.

The importance of heredity as a predisposing factor in bone and joint tuberculosis is still a widely debatable point, but I believe that one can say, without much fear of contradiction, that the tuberculous mother undoubtedly transmits to her offspring a weakened condition of tissues which predisposes to tuberculous infection. Of course the presence of active pulmonary tuberculosis in a household makes more than probable the infection of other members of the family and an analysis of our cases at the State Hospital shows this to be a fact, for a high per-

centage of family histories show active disease.

There has recently been published an article reporting the findings of tubercle bacilli in the mesenteric glands of a certain number of still born children which substantiates earlier reports and makes the possibility of a true hereditary or congenital infection a fact which must be admitted.

Injury of a slight character would seem undoubtedly to be a factor in localizing tuberculosis, but whether this is due to the activation of a quiescent focus already present, or to the forming of a point of lessened resistance is still doubtful. Probably the former is the more common condition and we can readily understand how important as a cause an injury to an already sensitive joint would appear to the patient or parent.

Other predisposing factors which must not be forgotten are influenza, the exanthemata, especially measles, and lowered vitality from underfeeding and improper hygiene. At the State Hospital we admit more cases of bone and joint tuberculosis from the county covering the Iron Range than from any other county, due largely,

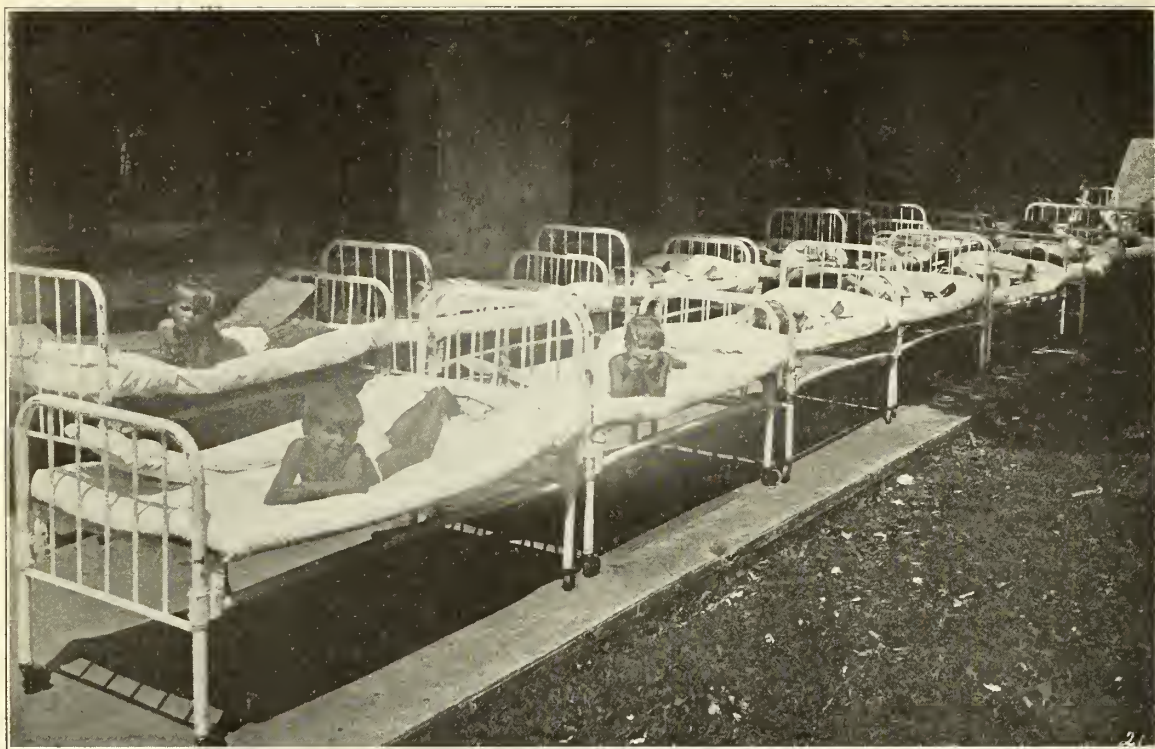


Fig. 1a

I believe, to the conditions under which the population, mostly foreign born, lives. It is vital therefore that these predisposing factors be removed, if the incidence of infection in children is to be lowered. Public health nursing will undoubtedly accomplish a great deal towards this end.

The pathology of bone and joint tuberculosis need only be touched upon here, but enough must be said to make clear that which follows. Pure diaphyseal bone tuberculosis, without joint involvement, is so rare in this country that it can be ignored, practically all cases being of the joint type. A joint should be considered as consisting of the ends of the articulating bones, the ligaments and capsule holding them together, and the synovial membrane lining the joint. Authorities differ in their statements regarding the points of original invasion by the tubercle bacillus but it is becoming more and more an accepted fact that the original focus is found about as frequently in the synovial membrane as in the bone ends; however in the spine, there being no synovial membranes between the vertebral bodies the lesion is necessarily primary in bone. The cartilages and ligaments, are, of

course, passive structures in joint disease and are never primarily involved. The disease once started, the lesions may vary from simple involvement of the synovial membrane to complete disorganization of the joint with marked destruction of bone. Pus may be present and this, together with the detritus resulting from the disease, may form a tuberculous abscess or, as it is commonly called a "cold abscess." The spinal cord may be involved to a greater or less extent in disease of the spine and a paraplegia result.

The spine is by far the most common site for surgical tuberculosis in children, the hip, knee, elbow, and ankle being next, in probably the order given, although statistics differ somewhat on this point. The wrist and hand are less frequently involved and the shoulder joint comes last on the list.

The signs and symptoms of the disease are fairly typical: stiffness and pain are outstanding features, with limitation of motion, muscular rigidity, swelling, atrophy of muscles and bone, and tenderness being almost constant features. Abscess formation occurs in a certain percentage of cases. The general condition of



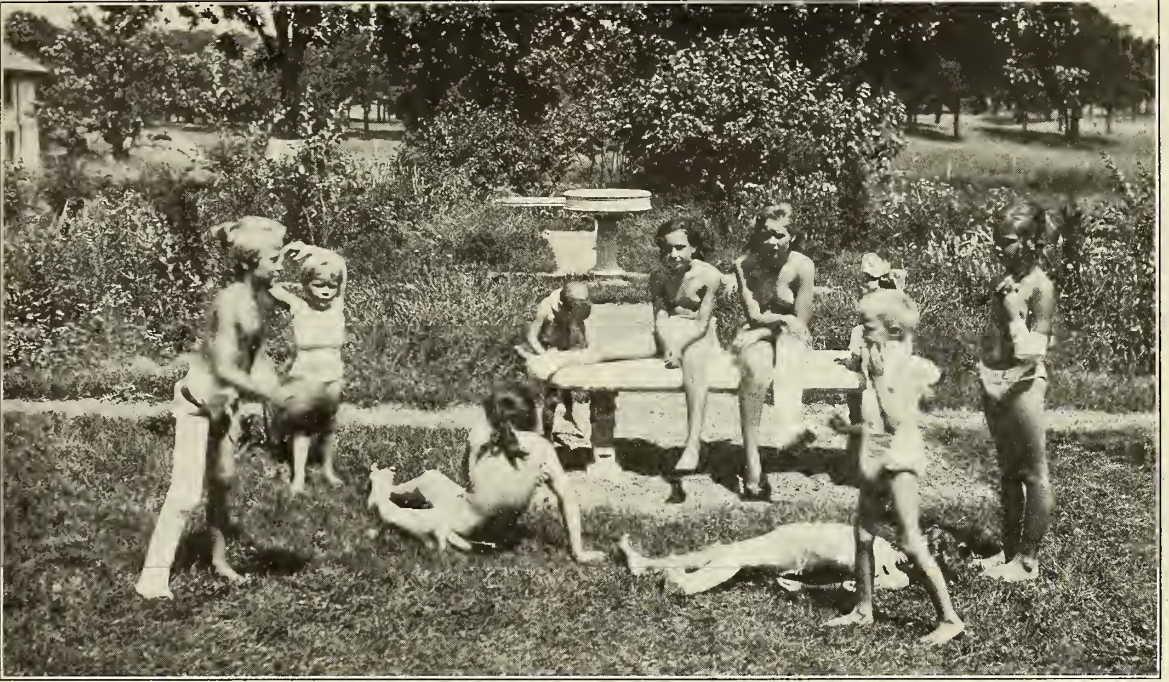


Fig. 2

the patient is below par and loss of weight, debility and fever are frequently present.

Early diagnosis is essential if the best results are to be obtained and for this purpose it is necessary that the physician keep constantly in mind the possibility of such an infection. The dictum that a subacute or chronic painful disease involving one joint only, in a child is practically always tuberculous, should never be forgotten.

Pott's disease or tuberculosis of the spine gives symptoms which should in most cases be recognized before the occurrence of the deformity but unfortunately the parent frequently waits until the "lump on the back" appears before seeking medical advice. Then of course there is no mistaking the diagnosis. A child who complains of pain in the back of the head or in the shoulders and arms, holds the neck still and protects himself from all sudden movements, or who complains of severe intercostal or abdominal pain with the same protective symptoms, all of which are not due to some apparent cause, should immediately be under suspicion. At the State Hospital we not infrequently admit cases which have been treated for digestive disorders for long periods of time on account of "pain in the stomach" and not until the deformity of the

spine appeared was the true condition recognized. This referred pain is so typical that its importance can not be overestimated.

The same is true in tuberculous infections of the hip-joint. There the typical pain is on the front and inner side of the knee due to the irritation of the obturator and anterior crural nerves. The fact that we sometimes see cases of this kind with all treatment directed towards the knee joint, even going so far as the application of splints or plaster of Paris shows the importance of remembering this feature.

The knee and ankle joints and joints of the upper extremity being more superficial than the spine or hip joints, the diagnosis is fairly simple

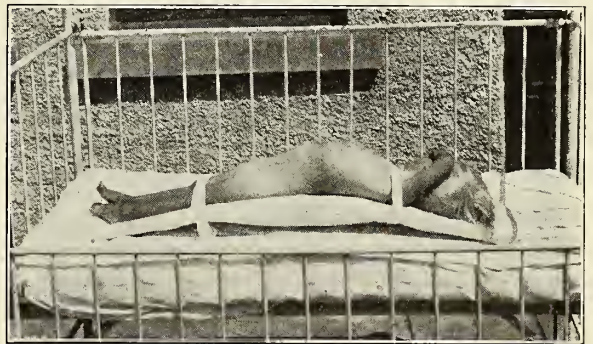


Fig. 3



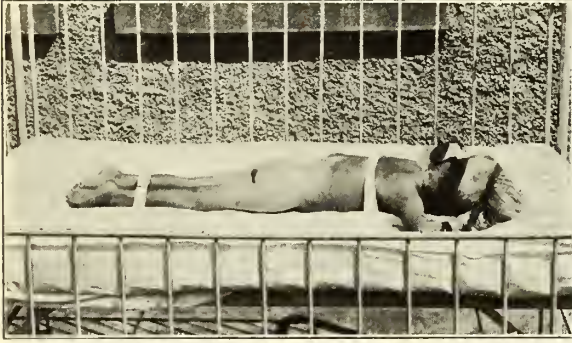


Fig. 3a



Fig. 4



Fig. 5

when they are the site of tuberculous lesions. Here the local swelling, accentuated by the atrophy of the muscles, the tenderness, the local pain and the muscle spasm are very typical.

The prognosis of all bone and joint tuberculosis in children is on the whole good as regards life. In infancy the mortality is high, but otherwise, if mixed infection is prevented and multiple joints do not become involved there is little danger. Locally ankylosis of the fibrous type is to be expected so that joint function rarely returns to normal.

The treatment must be both general and local. The general treatment aims at the building up of the patient and the improvement of the hygienic conditions so that the surroundings are such as will best help the patient to fight the disease. It is very surprising to see how quickly patients pick up in weight and in general appearance after coming to the State Hospital. The fresh air, good food, tonics and heliotherapy

cause such remarkable changes that one frequently wishes it were possible to treat private cases in an institution of this kind. The advantages of a state institution for the care of such cases is so apparent that it can not be long before every state has such a hospital available.

Heliotherapy, or the sun treatment of surgical tuberculosis deserves further mention. Rollier, of Leysin, Switzerland, has been the most prominent advocate of this treatment and it is largely due to him that its value has been recognized and the proper methods for its application worked out. The principal effects of direct sunlight upon the body are, first, that of a strong tonic, building up the general bodily resistance to infection and, second, that of a bacteriocidal agent. The ultra violet rays are the active constituents of the light and as these are filtered out by glass it is necessary that the patients be in the open, but protected from winds if the temperature is low. The high altitude of





Fig. 5a



Fig. 6

Switzerland seems to be of great additional advantage, but treatment even at sea level has been so advantageous that a low altitude is no contra indication for this treatment. The application of the sunlight must be very gradual and the condition of the patient watched carefully during the first few weeks. It is best to make out a regular schedule for the exposures following in general the scheme of Rollier.

Albee quotes Rollier as follows: "The first day only the feet are exposed at intervals of one hour, five times and for a period of only five minutes. The next day the legs will be exposed and the same method followed. The third day the legs will be exposed as far as the groin. The upper portion, from the knee to the groin will be exposed for five minutes three or four times; the lower portion, from the knee to the ankle for ten minutes. The fourth day the abdomen will be the new seg-

ment; the fifth day we will proceed to the insulation of the chest with the same precautions and covering the region of the heart with a damp cloth.

"If the condition of the patient will allow it, he will be placed on his stomach and present alternately the front and back of his body to the sun, which increases the total number of exposures to six or eight. Lastly, the sixth or seventh day, we will be able to expose the neck and head, due attention being paid to how he accustoms himself to it, and to pigmentation of the integuments. The preliminary precautions will soon be no longer necessary, and the patient will be able to tolerate the sun for six or eight hours with perfect comfort in winter as in summer.

"The pigmented integuments, over all their surface, take a beautiful bronze tint, varying from coffee to chocolate color. We have insisted particularly on the importance of the pig-





Fig. 6a



Fig. 7

mentation . . . which is nearly always proportional to the resistance of the patient. Delay or absence of its early appearance permits one to form a prognosis with the utmost certainty. . . ."

At the State Hospital we have found that the patients can be exposed more rapidly and for longer periods of time than the above indicates, probably because of the lower altitude. The results are shown in the photographs. Figs. 1, 1a and 2. The Alpine lamp, a mercury vapor lamp in quartz bulbs, can be used as a substitute for sunlight when the climate does not permit the latter but its effects can not be compared with the natural sunlight. Pigmentation seems to be less, but discharging sinuses some times clear up in a striking manner with its use. It is in constant use at the State Hospital in the winter and when the weather is unfavorable.

The local treatment of the various joints is

of equal if not greater importance than the general treatment and care must be taken not to neglect it in one's enthusiasm for heliotherapy. Innumerable forms of apparatus and appliances are used in this local treatment but the principle of all is the same, and that is fixation. Traction and extension are accessories. Knowing that the cured tuberculous joint is in most cases ankylosed, it is very important to see that the actively diseased joints are held in the best position for function after this ankylosis has occurred. These positions are, with a few exceptions, as follows: the hip in moderate abduction, slight flexion and a few degrees of external rotation; the knee, not more than 10 degrees from straight; the ankle, at a right angle; the shoulder, in slightly less than right angle abduction, partial external rotation and some forward flexion; the elbow, around or inside a right angle; and the wrist in a moderate cocked-up position.





Fig. 7a



Fig. 8

The methods which we have found most satisfactory at the State Hospital, and our statistics encourage us to continue with them, can be enumerated without taking much of your time. In tuberculosis of the spine the simple gas pipe frame, curved if necessary to give hyper-extension is used in the routine treatment of all acute cases. [Fig. 3, 3a and 4.] The position is varied daily in the subacute and convalescent cases by allowing the patient to lie in the prone position, raising on the elbows if he wishes. Later, that is in six months or a year, a brace or plaster jacket is applied and the patient allowed up. (Figs. 5, 5a, 6, 6a, 7 and 7a.) The operative fixation of the spine by the method of Albee or Hibbs is not used, as we feel that in children our results are so good that the subjection of the patient to operation is not necessary. Cases with paraplegia are also handled conservatively.

Hip joint disease is treated on the Jones ab-

duction frame or by a plaster of Paris spica. (Figs. 8, 8a and 9.) Traction is used in the acute cases to lessen intra-articular pressure. When much deformity is present the weight and pulley is used until it is corrected or, as sometimes happens, if complete correction is not obtained, gentle manipulation under an anesthetic is necessary to accomplish

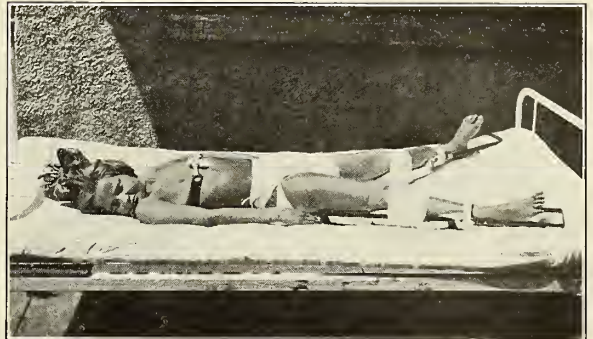


Fig. 9





Fig. 8a

this. If a spica is used the child can be up early, but it is considered better not to allow weight bearing and so the sole of the shoe on the sound side is raised about two inches and crutches are used. In this way the diseased leg hangs free.

Knee joint tuberculosis can usually be handled easily with plaster of Paris, (Fig. 10) weight



Fig. 10

bearing in the acute cases being prevented by keeping the child in bed or by using a high shoe as in hip joint disease. In convalescent cases a stiff knee brace can supplant the plaster.

Ankle and wrist joint lesions are held with plaster of Paris or light metal splints and the same is true of shoulder joint cases.

The tuberculous elbow is held in the plaster of Paris or in the so-called "collar and cuff" attachment of Jones which consists of two leather sleeves, one around the wrist and the other around the neck, through which a bandage is passed and so tied that the elbow is held in rather acute flexion with the hand against the neck.

Abscesses, when present, are left rigidly alone unless causing pain or discomfort from their size or unless they show signs of breaking through the surface by thinning of the skin and pressure necrosis. The great danger in these cases is mixed infection and its immediate result of sinus formation and chronic suppuration. Most of the deaths we see following surgical tuberculosis are due to amyloid disease resultant upon this long continued suppuration. Open incision and the insertion of a drain are never resorted to therefore but the abscesses emptied, when indicated, by aspiration, repeated as often as may be necessary. In this way no opening to the outside remains and the danger of mixed infection is reduced to a minimum.

The time necessary for the cure of all these various forms of surgical tuberculosis varies greatly but on the average children must be under active supervision for from two to three years. To do this properly in the home is almost impossible especially with the poorer class of people among whom bone and joint tuberculosis is most prevalent, and hospitalization is the only solution. Dispensaries with visiting nurses and social departments can only go so far and their main function, with the type of cases under discussion, should be the picking out of cases for the hospitals and the supervision of such cases after their discharge. Too strong a plea for the establishment of state institutions for the care of surgical tuberculosis in children can not be made. One needs only to compare cases when sent in for admission with the same cases some weeks or months later to see the reason. Lives



are saved and children who would become life long charges of the state are transformed into useful and productive citizens.

Let us hope that before long every state in the Union will accept its responsibility for the crippled and deformed children within its borders, as a few states already have, and maintain for them institutions such as Minnesota has in St. Paul.

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### OCULAR IMBALANCE\* (Heterophoria)

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*Mankato, Minn.*

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At the last year's meeting of the A. M. A., Dr. Samuel Theobald called attention to the meagre reports of ocular imbalance in the large eye and ear hospitals of the country, and his conclusions were that one of two things is lacking; either that the heterophorias from muscular anomalies are practically ignored in the case reports, or that they have been overlooked. He also called attention to the underestimation of muscular faults by many ophthalmologists and reminded us that while heterophorias are less common causes of asthenopia than refractive errors are, and that while they do not always accompany such errors, they are capable by themselves of producing manifest symptoms both local and remote, which some have learned to attribute to eye strain.

In choosing my subject I had no idea of trying to present any new thing to ophthalmologists but had in mind calling to the attention of the general practitioners—particularly those who do refractive work—to the prevalence of this condition, with some suggestive methods of treatment which have given me better results than any I have tried heretofore. Pardon me if I briefly refer to what we mean by “heterophoria.”

We describe it as a tendency of one or both eyes to depart from parallelism when in a state of rest and the positions assumed may be as follows: perfect binocular balance is known as orthophoria, a tendency of one visual axis to swing in is known as esophoria, to swing out

as exophoria, upward as hyperphoria, down as catophoria and any combination of two of these as upward and inward, as hyper-esophoria, etc. A tendency of both eyes to go above the horizontal plane of the head is known as anophoria, and any inefficiency or over action of the obliques as cyclophoria. With some who have dormant or sluggish nerve sensibility, these conditions in moderate degree seem not to have any particular disturbing influence while in others of greater sensibility they cause most distressing symptoms, and whether accompanied by refractive errors or not, there is often untold misery. Such deviations may have for their cause faulty insertion of ocular muscles, abnormal development of the orbits, anomalies of refraction, innervational disturbances, exhaustion from overworked eyes, and the cardinal symptoms may be briefly stated as follows: first, a burring or indistinctness of vision coming on after more or less prolonged use of the eyes at the near point, due to inability of the eyes to maintain accommodation or convergence without strain, or possibly from inherent weakness of accommodation, which act is generally admitted to be the result of action of the ciliary muscles on the lense changing its curvature; but this is emphatically disputed by at least one writer who has, after long and careful investigation, become convinced that this theory is wrong; second, headaches innumerable both in degree and variety, varying from slight discomfort, hardly noticeable, to a pain practically unbearable, and perhaps accompanied with gastric symptoms. Its location varies, but it is usually of the frontal type but may be referred to the temple, the base of the back of the neck, constituting what is commonly called the “check rein feeling.” Rarely is it referred to the vertex and it may be differentiated from frontal sinus infection or obstruction by the absence of “Ewing's sign;” third, hyperemia of the conjunctive, though not always present, is occasionally, and the association between it and imperfect accommodation is very striking. Lachrymation may be present, and the overflow so abundant and constant as to suggest lachrymal stenosis, but it disappears after refractive errors and eye strain have been removed. Vertigo sometimes occurs.

The varying conditions contributing to eye-

\*Read before the Southern Minnesota Medical Association, Fairmount, June, 1920.

strain are so complicated and so numerous as to make it impossible to prescribe glasses so as to give relief and comfort with any degree of certainty by the refraction alone even when refractive errors appear to be the assignable cause. If we rely upon refraction alone, not taking into account contributing causes, as faulty accommodation, orbital malformations, status of extra-ocular muscles, we shall often fail, for, to correct hyperopia accompanied with exophoria of any marked degree will aggravate the trouble and be like goading a jaded horse. This would also be true with many other refractive conditions complicated by heterophoria.

It should be our aim to adjust corrections—so far as possible—so that the intrinsic and extrinsic muscles can work together in harmony, and in order to do this I have sometimes found it necessary to prescribe lenses the opposite of that which the refractive error called for. This sometimes brought satisfaction. Stevens, in his book "Motor Apparatus of the Eyes," describing the conditions of asthenopia and muscular anomalies, calls it "a perplexity from associated movements, caused by continuous compromising adjustments that have to be made which causes the pain and weariness so characteristic of these affections," and it seems to me no better explanation can be made.

We may illustrate in part, at least, by the attempt to use strong magnifying glasses; at first only a slight discomfort is felt but if the attempt be prolonged vertigo and nausea will ensue. This does not occur if one eye be closed, hence the disturbance must be in the confusion arising from efforts at binocular vision under difficulty. As nature abhors a vacuum so does she diplopia. There are cases where the anomalies are due to faulty attachment of muscles. In such, operation is often justified and it may be the only alternative for relief. Where the trouble arises from inherent or acquired weakness of the muscles, improper development, paresis, then gymnastics are indicated; when from overuse, general systematic depletion by illness or following major operations, then rest must be the remedy. Recovery may be a slow process, as many such, date the inception from a sick bed and often by excessive use of the eyes while reading when time hangs heavy. When caused by over-use, bad light, or refractive er-

rors, the continuance of use under the same conditions can only aggravate the affection.

We are sometimes able to relieve weakened muscles temporarily by the use of prisms but they are only a crutch and the muscle relieved, relaxes effort, loses a part of this stimulus, gets lazy, becomes weaker still so that from time to time stronger prisms are required and the patient is not cured.

In times past, and even to the present, remarkable cures have been reported of relief from heterophorias and also from remote reflex phenomena by partial or complete tenotomies or the readjustment of faulty detached muscles of the eyes; but the method while still in vogue is not so common as some twenty years ago. It has its place and is sanctioned where other methods fail. Disciplinary treatment has been recognized, advised, and various methods recommended, but as ordinarily used has been very unsatisfactory in my hands. Wall to wall, ceiling to floor, target and candle, and even prism practice as advised have availed me little.

The difficulties with them all, I believe, is in permitting patients to employ them without supervision. To attain success with any disciplinary method the muscles must be regularly, intelligently and systematically exercised and not overworked, and with prisms, these must be placed correctly, quickly; this is hardly possible for the patient to do without time intervening between changes, giving opportunity for muscle relaxing in the interval. Regularity, accuracy, persistency and rapidity are prime necessities for success. To satisfactorily impress these facts upon patients is practically impossible for me to do as they invariably fail to follow instructions, and consequently, whenever I am successful with them, it is because of supervision, encouragement, directing and watching the effects from day to day: otherwise I accomplish practically nothing. Patients who practice at home—except when using prisms—are unable to note progress and they may overwork and lame the muscles and thus do harm instead of good.

Within a comparatively few years instruments have been invented which simplify prism practice for they do away with the spectacle frame and the slow process of prism placing, assure accuracy of position, leaving no oppor-



tunity or interval for the eyes to relax convergence or accommodation.

The DeZeng and other phorometers are valuable instruments for quick and accurate diagnosis, and the revolving prisms can be used for discipline. However, for this, I prefer the "Hazen Kratometer" having used it for the past six years, as my patients complain that with the revolving prism the light target changes shape and color about the time twenty-five or thirty degrees have been reached, and it is my observation and impression that they do not lift as many degrees with it as with the prism bar.

Dr. Hazen, of Des Moines, an ardent student of heterophorias and a champion advocate of muscle training, invented some years ago his so-called "Kratometer." With it I find the work greatly facilitated and simplified as it does away with the uncertainty and inconvenience of other prism practice. By its use, I have been able to score results never before attained. With the newer devised and recommended stereoscopic methods I have had no experience. Some of the first cases treated with the Kratometer were disappointments due to unfamiliarity with the instruments and also in my anxiety to rapidly cure my patients, I overworked the muscles.

Three of these patients were physicians who were irregular in attendance and the following history case will illustrate my mistake. A school girl, age fourteen, consulted me for headache whenever she used her eyes for close work. Vision 20-30, accommodation normal, adduction five degrees, abduction four degrees, and convergence (dot and line) only to sixteen inches. Orthophoria for distance, and exophoria near, slight hyperopia, correction of which gave no relief. She was given fourteen disciplinary treatments of internal recti muscles—one daily—giving from seven to eight lifts at each sitting and she progressed slowly up to the fourth sitting when she could overcome eleven degrees, but subsequently went back until at the fourteenth she could overcome but six. Treatments were then suspended. Six months later she was persuaded to try again and I began by giving only four lifts at a sitting and she progressed rapidly up to fifty degrees at the twenty-eighth treatment, and one month later she could overcome the same without practice in the interval.

The following school year she was able to use the eyes with comfort.

The experience with this girl and others previously, taught me that it is easy to overdo the exercises, and therefore we must be careful.

One other case taken at random exemplifies results of some fifty or more treated with satisfaction as my "follow-up" records show.

This girl had not only marked exophoria but right hypophoria as well. She was a school girl, age eighteen, and complained of blurring and running together of letters whenever she read; also with frontal headache accompaniment. She had been refracted elsewhere without relief. Subjective tests showed slight hyperopic astigmatism in right eye and low degree of hyperopia in left eye, with adducting power fourteen degrees and abduction thirteen degrees, right hyperopia six to ten degrees at different tests. She could converge only to sixteen inches and there was exophoria of nineteen degrees for distance. Disciplinary treatments were begun with the Hazen Kratometer, five lifts at each sitting—once daily for fifteen days—at which time the eyes recorded orthophoria for distance, adducting power of fifty degrees, and inferior turning of right of three and one-half degrees as against one degree when we began treatment, and all hyperopia had disappeared. Two years later she wrote me that she had had no further trouble since treatments, that she took extra school work the following year and soon discarded the glasses given her at the end of treatments.

This case is in marked contrast to the teachings that disciplinary treatment of the superior and inferior rectus muscles is of no benefit.

Prisms of one-quarter degree interval were used in the discipline of the superior recti and such must be used to get results with either the superior, inferior recti or the obliques.

My observations so far lead me to believe that young persons respond more readily to the treatments than do older persons. I seldom carried the exercise to exceed fifty degrees in adduction and this seems ample for reserve power for all necessary prolonged use of the eyes for close work. The woods are full of these sufferers who have exhausted both means and patience in a weary round consulting ophthalmologists, optometrists, chiropractors and other cults

without benefit. I find it difficult to persuade my patients—who are usually from some distance out of town—to stay long enough to get results. These people are disheartened, skeptical, and as it requires an average of twenty treatments—one each day—few feel willing to spare the time and expense of being away from home so long.

In the larger cities there is a lucrative field and a splendid opportunity for those who will carefully diagnose and treat these cases by gymnastic exercises, for here the patients can remain at home and go daily to the physician's office without extra expense or loss of time as in the country, and their gratitude is unbounded.

#### DISCUSSION

DR. H. A. BEAUDOUX, Minneapolis: This paper coming from Dr. James is of special significance to me as it must be to every one of you who knows the experience of the essayist in refractive work. Dr. James probably stands next to none in the State of Minnesota and perhaps many of the states in the Union as a refractionist. He has had the experience and patience to carry on this work for many years—to my knowledge for twenty-five years—and anything he may have to say on this subject can be considered with great authority and of great importance. He has already said that ophthalmologists have neglected the subject for the reasons he has given you. Patients are rather intolerant of the treatment, which is lengthy and tedious. Doctors get tired of working with patients perhaps for two reasons, one of which is because patients do not encourage the work, and second, because they are not willing to pay for it. However, I think the neurologist, if no other member of our profession, has appreciated the work which has been done on the eye muscles. Many cases of so-called neuroses or neurotics are not neurotics at all, but the nervous condition back of it is oftentimes due to muscular imbalance.

Dr. James has not mentioned one feature which I think he has overlooked and knows well enough about it, and that is, focal infection. It has a great deal to do with heterophoria. The foci of infection may be found in the nose and throat, or the ethmoid cells, but more particularly the teeth.

Not very long ago I had the case of a young man, 27 years of age, who complained of asthenopia and muscular imbalance. After looking over him carefully I decided that some of his teeth should be taken care of, and 14 degrees of hyperexophoria disappeared after the removal of fourteen teeth. Oftentimes these patients are misguided by the so-called physicians whom they consult for relief. Personally, my experience has been spasmodic. Every time I meet Dr. James I receive a new and better encour-

agement about it, and I have gone home thinking I had become somewhat indifferent about this condition.

Dr. James is to be congratulated on his persistence. Like Theobald of Baltimore, Stevens of New York, who have persistently hammered away at the subject, he has done a great deal of good.

#### THE PHYSICAL EXAMINATION OF THE NORMAL HEART OF THE CHILD\*

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On account of limited time I shall be unable to discuss in detail the anatomical and physiological peculiarities of the heart of the child, the knowledge of which is valuable in the physical diagnosis. In general, the heart of the child lies higher in the thorax than does that of the adult. It is also more horizontal and the apex beat is farther out. As the child grows older the heart falls downward and inward assuming, at about the seventh year of life, the adult topography, when the heart apex beat can be seen and felt in the fifth interspace inside of the mammillary line.

The actual apex beat in the normal child, is circumscribed to one space in the infant, about 2 cm. in diameter, and to 1 or 2 spaces in the older child. In the newborn it is rarely visible or palpable, while in the older child, it may be either seen or felt or both.

In the adult, the apex beat is formed only by the left ventricle, but in the child, especially in the infant, the apex beat is made up of about  $\frac{1}{2}$  of the right ventricle. This is due to the fact that the right ventricle, at birth, is as large as the left and remains relatively preponderant for from 3 to 6 months.

The intensity of the apex beat varies in different children and at different ages in the same child. The thickness of the walls of the thorax and whether or not the beat happens to be behind a rib, are factors which influence the intensity. The change of the apex beat is greatly influenced by the change of position of the body. It moves as much as 2 cm. to the left or to the right respectively, with a bodily change. If the child is lying on the right side, the apex

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.



beat may be entirely impalpable on account of the overlying lung. Pushing the body forward will sometimes make an invisible or impalpable apex beat visible or palpable. Deep expiration may bring out the beat more prominently because the lungs become retracted. Psychic or physical stimulation to cardiac activity usually intensifies and diffuses the apex beat.

In general it can be said that in the first half of childhood the apex beat lies in the fourth, or fourth and fifth, and in the second half of childhood it lies most often in the fifth space. Up to three years it is never more than 2 cm. outside of the nipple line and after that, never more than 1 cm. These can be used as normal limits. If the apex beat is outside of these limits, one must always be suspicious of an abnormal heart, providing that the nipple is not in an abnormal position.

#### PERCUSSION

Percussion as a method of physical diagnosis is not sufficiently exact. It involves the personal equation of the examiner, what he considers the first change of tone, the conditions under which the examinations are made and the technique he employs in his percussion.

The results obtained from percussion are affected by many varying factors in a growing child, viz: the position of the child while being examined, the size and shape of the thorax, the vibrations of the walls of the overlying lungs, the skeletal characteristics of different children of the same ages, and the difference of children of the same age in body weight and in body length.

It is always best to percuss the back first. One should attempt to carry out the examination without the child being aware that anything unusual is being done. A very delicate stroke is necessary because in the young, on account of the thinness of the chest walls, the tone produced is very easily modified by the surrounding tissues.

In the adult absolute dullness may give quite accurate results, but in the child it is practically impossible to elicit accurately the uncovered portion of the heart.

The absolute dullness in the nurseling is bounded above by the third rib; the right border is just to the left of the sternum; the

left border is precisely at the nipple line. From 2 to 4 years the borders are a little lower and slightly over to the right, the upper border falling to the third space. From 4 to 12 years, there is still another drop, the base of the heart descends to the level of the fourth rib; the left border moves from the mammillary line to 1 to 2 cm. within it, and the right border moves from 1 to 2 cm. to the right of the midsternal line.

In the adult, the left border is always within the nipple line, whereas in the young child it is usually at or outside of this line. In the adult, the sound at the upper part of the sternum is always clear; in the period of infancy, it may be impaired on account of the thymus. In general 2 cm. more or less than the figures given above can be allowed for a normal variance. Any increase in size to the left indicates an enlargement of the left ventricle. An increase to the left and upward indicates enlargement of the left auricle mainly, and to a lesser extent the left ventricle. If percussion shows increase to the left and downward, the left and right ventricles are involved, and lastly, enlargement to the right involves mainly the right auricle and only slightly the right ventricle.

#### AUSCULTATION

Auscultation is the most useful and reliable of all clinical methods in the diagnosis of heart diseases of children.

The success of an auscultation depends as much upon the patience and the resourcefulness of the examiner as upon his skill in physical diagnosis. In the newborn, the heart rate and the respirations are so rapid that it is very difficult, especially if the baby cries, to hear the heart sounds clearly. However, usually during the forced apnea, one may hear several cycles with sufficient distinctness to determine whether or not they are normal. Sometimes it may be possible to hear the sounds more clearly over the scapula than over the precordium, because of less interference from respiration.

At birth the sounds are tie-tac in character as in the fetus. This usually disappears in a few days, although sometimes persisting for a week. At this time one cannot observe any difference in the tone of the sounds. At about

the end of the second year, the first sound becomes booming, louder than the second, and remains so throughout all childhood becoming more accentuated at about puberty. The sounds are usually louder in boys than in girls. They are louder in standing posture than in sitting, and louder in sitting position than in lying.

Pressure with the stethoscope changes the character of the tones considerably. The inhibitory mechanism controlling the heart is weaker in the child than in the adult, therefore the rate of the heart and the quality of the sounds is more easily influenced. Crying, forced expiration, fever however slight, cause accentuation of the sounds. In anemia and neuroses, the sounds are often louder and give what is known as the "metallic clique". In chronic diseases of the lungs which cause a disturbance of the pulmonary circulation, the pulmonary sounds are usually louder (except in pulmonary stenosis) over the tricuspid area and the apex. A slapping sound at the apex, as in the adult, is very suggestive of a mitral stenosis.

The second sound at the tricuspid area is also accentuated in all conditions where there is pulmonary or bronchial involvement as in pertussis of long standing, in asthma, and in congenital heart disease. The aortic sounds are very rarely accentuated in children. The aortic sounds are always weaker than the pulmonary tones in the normal heart, and since their accentuation depends upon an increase of peripheral blood pressure, and since diseases of blood vessels are extremely rare, accentuation of the aortic sounds is very rare. All the sounds are generally diminished in myocarditis and in the terminal stages of decompensated hearts.

The gallop rhythm is caused by an abnormally stimulated heart activity. It is physiologic in the newborn giving the tic-tac character to the tones. This phenomenon is rather frequent in children whenever the rate is greatly increased. It occurs in fevers quite often. However, the true gallop rhythm which is always indicative of myocardial involvement, is rare in children. It occurs most frequently in diphtheria, and in decompensated hearts with acute dilatation. It is always a grave omen under these circumstances.

Impurities, unevenness, roughness and split-

ting of the sounds especially the first are much more frequent in the child than in the adult. These are usually found in perfectly healthy children. They are too often diagnosed heart murmurs and treated as heart diseases.

#### MURMURS

So much has been written on the subject of murmurs, so many different explanations have been given for their causation, that after reading the literature, one is bewildered in the attempt to apply all the various opinions and theories to physical diagnosis.

At birth and for the first few weeks, a heart murmur is quite common. It is practically always associated with a patent foramen ovale or a patent ductus arteriosus. With physiological changes, these murmurs disappear.

The vast majority of murmurs heard during the period of infancy are congenital in nature. They are often very loud, they may be musical and harsh. They may be heard all over the chest and back and even over the abdomen. The most common site for this class of murmurs is at the left of the sternum over the second and third intercostal spaces. This is usually the point of maximum intensity, from which they may be transmitted in all directions. Congenital heart murmurs are extremely variable on account of the involvement of more than one structure of the heart.

#### ACQUIRED MURMURS

As in the adult these murmurs are the result of inflammation of the endocardium. They occur only rarely in infancy. They are usually the end results of one or more attacks of tonsillitis or rheumatism. They of course can be caused by any other acute infection. They are frequently best heard at the apex and transmitted most often towards the axilla and the back. They are sometimes musical, rarely harsh, and although loud not so loud as the congenital type. The systolic murmur is by far the most common in acquired heart disease. It may or may not entirely replace the first sound at the apex. The diastolic murmur which is very rare in the child is always pathological and usually is a part of a double murmur.

#### NON-PATHOLOGICAL MURMURS

This form of murmur is much more frequent in the child than in the adult and has been a



cause for much dispute and discussion. This group includes the accidental, the cardiopulmonary, the anemic, the compression, and the atonic.

I have selected for discussion 26 children from 6 to 12 years of age in whom I found what I considered non-pathological murmurs. I arrived at this conclusion by reason of the normal size and shape and position of the heart obtained by percussion, the absence of any signs of heart disease discoverable with the roentgen ray and the electrocardiograph.

Authors have reported very severe cases of anemia without any murmurs, and on the other hand children with normal hemoglobin may have marked murmurs, so that anemia as a cause of bruits is only incidental. Two of these cases, only, had a hemoglobin of less than 80 per cent.

#### CARDIOPULMONARY

Of the above series only 4 presented certain characteristics which justified the diagnosis of cardio-pulmonary murmurs. The murmurs were systolic and heard best at the left of the sternum at about the third interspace rather than at the apex, as is claimed by some, and were markedly decreased and often absent upon holding the breath. The murmurs changed with the alteration of position but I found no constancy in the change of the murmur with the alteration of position as is claimed by some observers.

#### ACCIDENTAL MURMURS

Fifteen of these cases may be considered as accidental types. There were absolutely no signs of heart disease and the roentgen-ray shadows and the electrocardiograms were normal. Some were in so-called nervous children, but it could not be seen why nervousness should, as some think, cause this type of murmur. The murmurs were all systolic in time, soft, superficial, usually losing their intensity before the end of the first sound. In all cases the murmur was heard at the pulmonary area and over the apex. In only 3 cases was it heard only at the apex. They were all well localized, only in 1 was there any transmission into the axilla. The belief that these murmurs are heard best while lying and tend to disappear when erect

cannot be substantiated by the above observations.

In the majority of cases the murmur is the least important sign in the differential diagnosis between organic and inorganic heart disease. The only constant characteristic of these murmurs is their inconstancy. After a careful survey of all the important literature on this subject, it would seem that a voluminous classification such as above mentioned is unnecessary and impractical. For all practical purposes it is sufficient to divide murmurs formed in children into the organic and the non-organic; if a murmur is not associated with enlargement of the heart or other signs of heart disease, congenital or acquired, the murmur should not be given serious consideration, and the child should be advised to lead a normal life in every respect.

#### VENOUS HUMS

The venous murmur or hum is of very frequent occurrence in normal children. It is heard most frequently in the school age, rarely during infancy and it is influenced by position and by pressure with the stethoscope. This bruit is heard through the entire heart cycle, over the internal jugulars, sometimes loud and harsh, at other times low pitched and soft. It is loudest at the inner third of the clavicle sometimes on one side, sometimes on the other. The murmur is almost always diminished or disappears in the prone position and is usually accentuated by moderate pressure with the stethoscope.

Eustace Smith has described a venous murmur which he claims is heard in early tuberculosis over the second interspace usually to the left of the sternum, sometimes also to the right. He believes this is produced by the pressure of enlarged bronchial glands on the left innominate vein. I have examined many early cases of tuberculosis for this sign and was unable to find it with any constancy. On the other hand, I found this phenomenon in a few instances in association with the venous hum in normal children. I believe it to be of no diagnostic value.

Arterial murmurs are always pathological in children. They are heard best at the angle of the jaw or inner edge of the sternocleidomastoid muscles. A pressure murmur can be demonstrated often in normal children by applying

a stethoscope with some force over the larger arteries. A systolic murmur also is heard very frequently over open fontanelles. This is especially common in rickets during the first year of life. Arterial murmurs over the vessels of the neck are very common in congenital heart disease.

#### DISCUSSION

DR. W. R. RAMSEY, St. Paul, Minn.: I think Dr. Seham is to be very highly congratulated on his paper because there has been little done on the normal heart of the child. A good deal of our work has, of course, been done on the heart of the adult. There has been a great tendency on the part of physicians to regard children as simply immature adults, but we must get away from the idea that children are simply immature adults and that we can apply the same rules to children as to adults in a relative way. We must stop saying that a child can take one-fifth the dose of the adult because it is one-fifth the size or one-fifth the age. It is an entirely different matter, but it has not been brought out very well. One English author has written a very good little book on that, Dr. Sutherland, but Dr. Seham brings out some very important points which he did not emphasize.

I wish to emphasize that the relative position of the heart is changed a great deal by any slight deformity of the chest and since so many children have rickets we do find marked deformity. These positions that Dr. Seham has given you will be modified as there is any modification in the chest wall.

I also wish to emphasize, as Dr. Seham mentioned, the very great frequency of heart murmurs in children, many times of no serious moment. It is very difficult to say when they are and when they are not serious and it is important to be very guarded in the prognosis, because I have watched many that I thought were serious in the beginning, but after a while the great majority have disappeared. I do not know to what they are due. To show how one may be mistaken, a few days ago a boy came back from the seashore where he had been spending the summer. I had never found a murmur but he had a little intestinal upset, and I saw him for that and on listening to the heart in the course of the examination I was amazed to hear a loud systolic murmur. They boy had been swimming a great deal. It looked as if he had, probably, an aortic stenosis, so I told them he had this murmur, but that we would not say much about it for it might disappear. Sure enough, after two or three days in bed I found no murmur at all.

I consider this a very important and timely subject and think Dr. Seham covered it very well.

DR. E. J. HUENEKENS, Minneapolis, Minn.: I wish to thank Dr. Seham for this important paper. I hesitate even to discuss it because Dr. Seham has made a more extensive examination of the heart and particularly of electrocardiography in children than anyone in the country. I was privileged to hear a paper last

night by Dr. S. M. White on the unimportant heart murmur, particularly the hemic, but it might have been on the unimportance of murmurs in any part of the heart.

I wish to emphasize that we can pay too much attention to heart murmurs and make invalids of children who should be up and about playing. The same is true of murmurs heard shortly after birth. They may disappear very quickly and we should be very careful about making diagnoses of congenital heart defects in children soon after birth. They are apt to disappear promptly and leave no trace.

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#### SPINA BIFIDA\*

#### A REVIEW OF 187 CASES, INCLUDING THREE ASSOCIATED CASES OF MYELODYSPLASIA WITHOUT DEMONSTRABLE BONY DEFECT.

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The condition of spina bifida never fails to arouse the physician's interest, since it puts him directly face to face with a most perplexing biologic phenomenon. Although in most instances no diagnostic acumen is required for its recognition, occasionally a problem of extraordinary difficulty is presented, particularly in the occult variety of the disease in which the onset of symptoms may be delayed until the declining years of life.

Spina bifida is one of the most common deformities, making up one-sixth of all monstrosities (Chaussier); it occurs once in from one to two thousand births. Tulpinus, in 1641, named the condition spina bifida; the Greek designation, *rachischisis*, is customarily reserved for the most marked type of the defect, in which the entire medullary canal fails to close.

The defect may appear as a spina bifida cystica or as a spina bifida occulta; the majority are of the cystic type (Fig. 1). Subdivision of the cystic type depends on whether the walls of the tumor include only the membranes of the cord, that is, a meningocele (Fig. 2), or whether they include both the membranes and the cord, a meningomyelocele; the central canal of the cord may be dilated, when the growth is termed a syringomyelocele, or the cord may be turned completely

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inside out, when the sensory roots come to lie laterad and ventrad to the motor roots. The nomenclature is not uniform. Because of this and because of the difficulty of determining the exact relations by clinical means alone, I have not attempted to classify the cases further than by evidence of accompanying cord involvement, which was found in 67 per cent of the cases (Fig. 1).

A very important condition allied to spina bifida, although it represents only a fraction of such cases, is an analogous developmental defect of the spinal cord, that is myelodysplasia without demonstrable bony defect. It is important from both the biologic and the clinical standpoints.

Spina bifida is usually posterior, but may be lateral; it occurs anteriorly, (Budde), although very rarely, and then it has an altogether different embryologic significance.

#### THEORIES OF THE ETIOLOGY

The causes for the development of spina bifida and the manner in which it develops have been the object of a great deal of speculation and research, but are still unknown for the most part. In the embryo closure of the neural canal is completed by the beginning of the third week, the upper and the lower ends, where the spina bifida usually occurs (Fig. 1), being the last to close. Whatever the cause of the defect may be, it seems to have been active prior to this. The theories of adhesions, either amniotic, resulting from amniotities with hydramnios, or lack of separation of the skin from the medullary plate (Cruveilhier, Ranke), have largely been displaced. The assumption of abnormal bending in fetal life (Chaussier) hardly brings the solution nearer.

One of the oldest theories, strongly championed by Morgagni in 1779, rejected by most writers since von Recklinghausen's comprehensive dissertation on spina bifida, in 1886, and recently rediscovered and espoused by numerous writers, is the theory of hydromyelia. According to this theory the choroid plexus, activated, perhaps by a hormone, secretes such a large quantity of spinal fluid that it either prevents union of the medullary folds or ruptures them after union has taken place. Interference with the absorption of spinal fluid is advanced as the alternative mechanism. The rapid accumulation of fluid

then is given as the primary cause; the resulting cyst is interposed as a bulging mass between the lateral mesodermal structures, preventing the approximation and fusion of the lips of the medullary groove. One of the main supports of this theory lies in the fact that spina bifida is often associated with hydrocephalus, which is rapidly made worse or, if not already present, may rapidly be produced by operative closure of the spinal defect. The assumption of an excessive amount of spinal fluid obviously depends on the further assumption that the choroid plexus is secreting fluid at this early embryonic period. This hypothesis seems inadequate when the whole problem is considered; one of its most serious objections is the fact that the choroid plexus does not begin secreting fluid until about the tenth week, 2.4 mm. embryo, (Monakow), whereas all writers agree that the spina bifidous deformity is produced no later than the third week. Further, the cases in which there is a failure of the entire neural canal to close certainly represents a more serious type of the same fundamental defect and must accordingly be explained on the same basis; it seems highly improbable that the amount of spinal fluid secreted is so immense that the entire canal, from its cephalic to its caudal ends, would be torn open or union prevented throughout by the flow of the choroidal secretion. Complete absence of the cord, or amyelia, which accompanies many of these severe types (Schmaus and Sacki) must also be explained by a more comprehensive theory. Mention of micromyelia, diastomyelia, and diplomyelia, which occur with spina bifida and without it, would still further embarrass the theory. It is also irreconcilably at variance with the observation that the portion of the spinal cord involved lacks all evidence of pressure myelitis, with its disintegrating nervous tissue; on the contrary, it is seen to have remained at a standstill in its embryonic development, with embryonic nerve cells and embryonic blood vessels, as the area medullovasculosa (von Recklinghausen). Associated defects such as harelip, cleft palate, and club feet, are considered by recondate inference, to be the results of pressure on the nerve centers. While it must be admitted that the added area of absorption supplied by the cyst often prevents the occurrence of hydrocephalus, it would seem more reasonable to suppose that the faulty absorption of spinal

# FINDINGS OTHER THAN X-RAY, NOTED IN 187 CASES OF SPINA BIFIDA (Males 102; females 85)

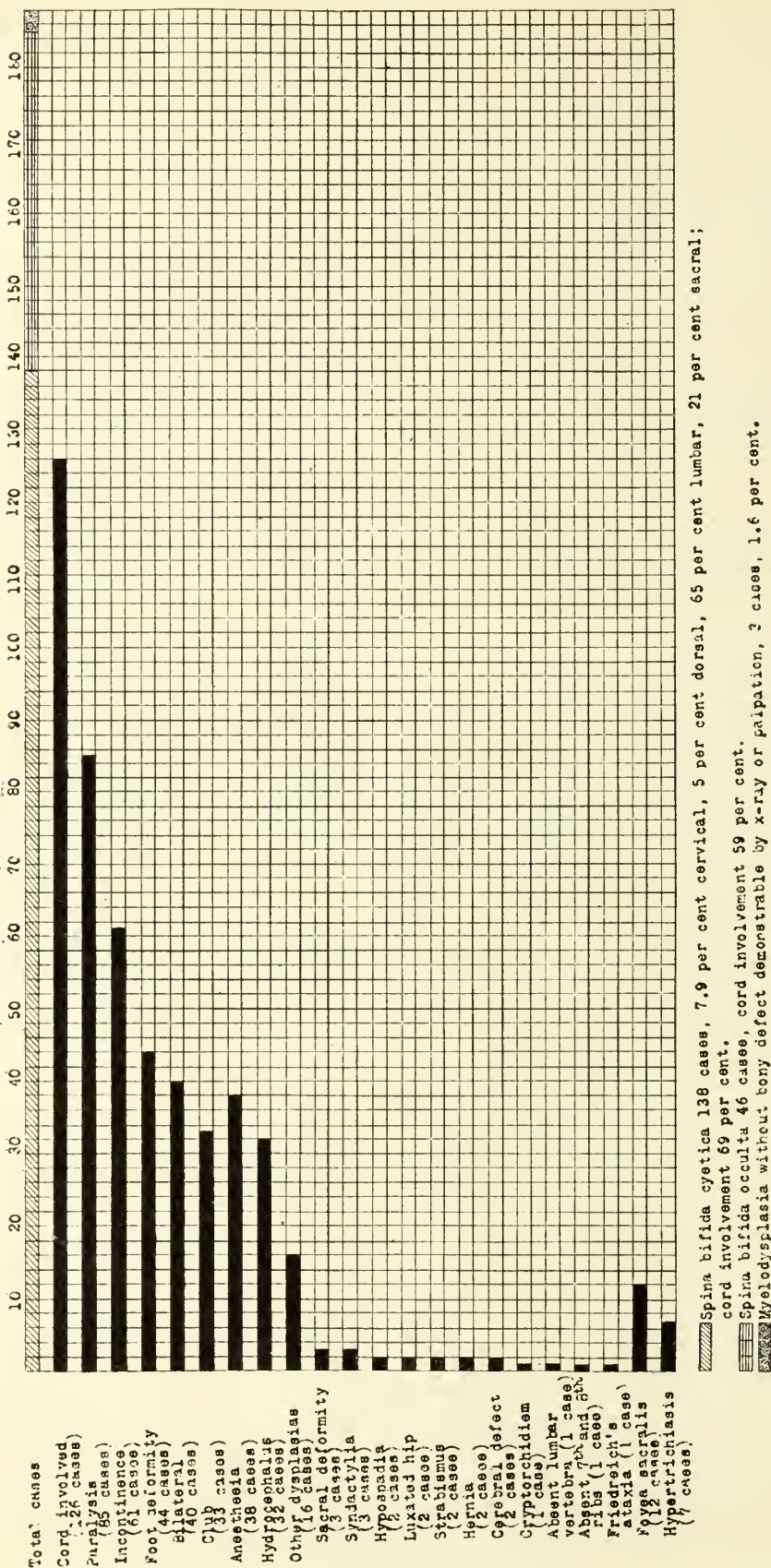


Fig. 1. Findings other than x-ray in 187 cases of spina bifida.



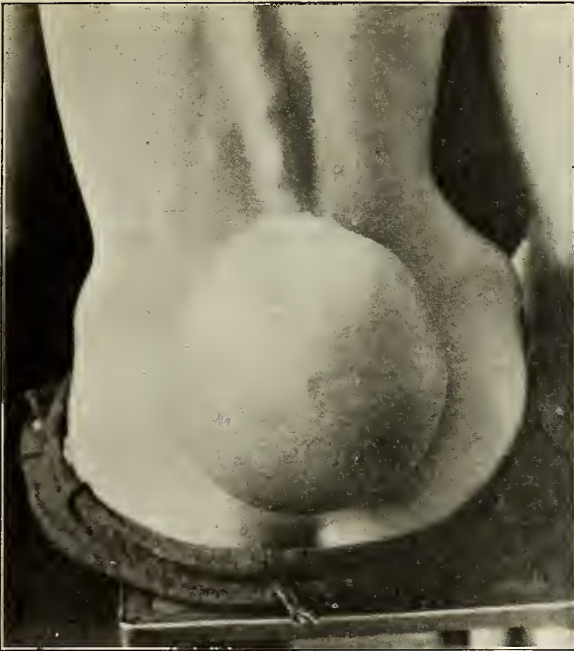


Fig. 2. (Case 329299) Large meningocele without any demonstrable involvement of the spinal cord.

fluid may also be based on some developmental defect. An associated cardiovascular defect has been suggested as a possibility.

von Recklinghausen believed that spina bifida is primarily due to a failure of the mesodermal envelope of bone and dura to approximate; he looked on the ectodermal dysontogenesis as secondary. The fact that a myelodysplasia of this type may occur without defects in the bone contraverts this theory; it suggests that the defect may be primary in the medullary plate. The types of spina bifida cystica and spina bifida occulta not accompanied by defects in the nervous system argue for the reverse. The necessity for making one primary and the other secondary is not apparent. Whatever the exact mechanism may be, it does not complete our search for the more fundamental process in which we are primarily interested.

There is much evidence against assuming that the basis is germinal, or developmental, and such cause has been generally discarded. I do not believe that this is altogether justified. Thus the presence of developmental defects in Case A286355 (Table 1), in which the closely related defect of enuresis and sacral dimple were transmitted to six persons on the male side, through three generations, is clearly an instance of her-

edity. Case A213465 and Case A259846, in which the same defect appeared in siblings, do not furnish conclusive evidence, since maternal environmental factors might have been just as potent and quite as likely as developmental factors. On the whole, the hereditary element hangs on a very tenuous thread; it must be assumed for occasional cases, but these are not numerous enough to argue for its acceptance as the sole cause.

#### EXPERIMENTAL PRODUCTION OF SPINA BIFIDA AND OTHER ANOMALIES

Recent work among biologists cannot be disregarded as some writers are disregarding it simply because it has been carried out on lower forms of life. The experimental production of spina bifida by modification of the environmental medium has taught us a great deal. A brief review of this evidence is profitable. Probably the most striking demonstration of the importance of environment in the production of spina bifida was that produced by Hertwig, in 1896, who subjected the axolotl, a salamander, to different concentrations of sodium chlorid solution. He found that a 0.5 per cent solution had no effect, a 0.6 per cent solution produced monsters in 50 per cent, while 0.7 per cent solution resulted in development of spina bifidous monsters in every case. Stockard, using *Fundulus heteroclitus*, the common minnow, produced spina bifida by using magnesium chlorid. Cyclopes could be produced in at least 50 per cent of cases, which was somewhat more frequent than spina bifida. It was also demonstrated that alcohol, ether, and the alkaloids could be used with similar results.

In order to demonstrate the applicability to man of these factors of monster production, Werber used substances produced in the human metabolism, namely butyric acid and acetone. He exposed *Fundulus heteroclitus* in the two, four, eight, and sixteen cell stages, to the action of 1-12/1-14 gm. molecular solution of butyric acid in sea water, from fifteen to twenty hours; he produced a great variety of monstrosities, the extreme defect being the development of only an eye or an ear, the rest of the embryo failing to appear. Higher percentages of acetone killed the embryos, while lower concentrations resulted in the development of monsters. Werber concluded that faulty maternal metabolism

Table 1

HEREDO-FAMILIAL DEVELOPMENTAL DEFECTS PRESENT IN TEN (5.5 per cent) OF 187  
PATIENTS HAVING SPINA BIFIDA

| Case    | Chief Complaint or Defect of Patient                      | Relative  | Character of Defect of Relative  |
|---------|---|---|--|
| A213465 | Two cervical cysts, one dermoid                           | Brother   | Spina bifida; died   |
| A259846 | Incontinence  | Sister  | Spina bifida, discharging sinus  |
| A133521 | Hydrocephalus. Paralysis of legs                          | Brother   | Hydrocephalus  |
| A318453 | Spasms in legs  | Sister  | Mute   |
| A 75729 | Paralysis of legs   | Grandmother   | Deafmute   |
| A 83303 | Speech defect and athetosis                               | Brother   | Speech defect and athetosis  |
| A286355 | Speech defect, webbed toes<br>Mentally deficient, spastic | Father<br>Paternal uncle<br>Paternal uncle<br>Paternal nephew<br>Paternal grandfather | Speech defect, enuresis, sacral dimple<br>Speech defect, enuresis, sacral dimple<br>Speech defect, enuresis, sacral dimple<br>Speech defect, enuresis, sacral dimple<br>Speech defect, enuresis, sacral dimple |
| A281371 | Incontinence, webbed toes                                 | Sister  | Enuresis   |
| A223921 | Incontinence, dislocated hip<br>Club-feet                 | Father<br>Mother  | Sacral dimple, flat-feet<br>Hernia   |
| A239329 | Occulta, unrelated complaint                              | Child   | Cleft palate   |

might well be the underlying cause of dysontogenesis. Disastrous maternal effects of diabetic patients are well known. Keibel and Mall found that the chorion of nearly all monsters had been the seat of inflammatory processes which in time might well have interfered with normal metabolism. The frequent association of hydramnios makes this all the more probable.

Chemical methods are not the only ones by which monsters have been produced artificially. One of the other simplest devices is a modification of gravitational forces on frog's eggs. Simply turning upside down (Conklin) frogs' eggs in the two-cell stage may cause the development of double-headed or double-bodied monsters. A redistribution, by centrifugalization, of the heavier elements of the eggs constitutes another method. In the ascidian (sea squirt) eggs, in which different kinds of protoplasm give rise to different organs and tissues, this rearrangement may result in marked dislocation of organs. That the problem is complex is shown by the fact that some varieties develop normally in spite of this artificial rearrangement (Morgan). Lewis adopted the remarkably simple method of destroying different portions of the eggs of *Fundulus heteroclitus* by operation-needling, and so forth,

and demonstrated that the organs predetermined in the portion of the egg destroyed did not develop. He could thus produce a developmental defect in any portion of the body he desired. Kellicott found that subjecting the eggs of *Fundulus heteroclitus* to a temperature of the average household refrigerator, for a few hours or days, sufficed to produce every variety of defect.

That physicochemical action may produce developmental defects was demonstrated by Barden, who exposed both male and female frogs to the x-ray for one hour, prior to fertilization. He learned that exposure to the x-ray of the ovum or the sperm sufficed to influence the subsequent development of the eggs in such a manner that marked abnormalities, including spina bifida, resulted. Baldwin produced spina bifida in frogs by exposing a given part of the egg to the action of the ultra-violet ray.

The mechanism by which various factors influence the developing organism is also disputed. I can only refer to these briefly. Mall<sup>21</sup> assumed that nutritional factors *in utero* resulting from diseased fetal members underlie monster production. Werber postulated the theory of blastolysis, according to which a part or wedge of the germ substance is destroyed, resulting in



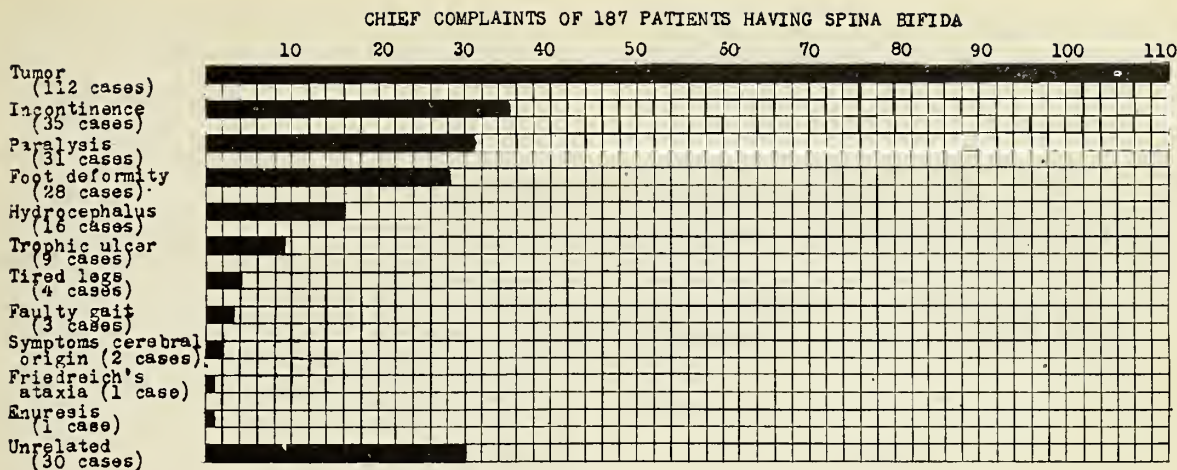


Fig. 3. Chief complaints of 187 patients having spina bifida.

anomalous fusion or dispersion of the part split off. Stockard believes that he has proved, by the use of magnesium with its well known anesthetic or inhibitory action, that an inhibitory action is responsible. Kellicott, espousing the hypothesis of disorganization, believes that this must take place before differentiation by gastrulation, through interference with the organization of the fertilized ovum. The discovery of the deleterious action of the x-ray and radium on the sperm, prior to fertilization, added another complication, since it proved that an abnormal character of the gametes may in some instances suffice to produce the defect.

von Recklinghausen's demonstration that the area medullovasculosa contains elements retaining early embryonic characteristics is of fundamental importance and prohibits the acceptance of the current theories, in the strictest sense, as an explanation of the larger group of cases not dependent on hereditary factors; or is it possible that lack of abnormality of function and metabolism, secondary to the apparent isolation of these elements, in the area medullovasculosa suffices to explain their embryonic appearance.

In view of the foregoing clinical observations and the facts adduced through experimental methods, it seems that spina bifida cannot be explained on the basis of any single factor, but by one or more of the following causes: abnormal character of the gametes or mechanical, chemical or physico-chemical factors influencing the embryonic rudiments, either before or after differentiation; the mechanistic action of accu-

mulated cerebrospinal fluid could act only as a secondary cause. A conception as broad as this seems to destroy all semblance of a theory; indeed, any precise formulation of a theory which does not take all these factors into account would be dogmatic, premature, and untenable at the present stage of knowledge.

#### CLINICAL DATA

The findings and usual symptomatology of spina bifida have been adequately and repeatedly described in the literature. Several features however, call for correction or deserve special emphasis. Figure 3 illustrates the chief complaints for which the patients came to the Clinic and Figure 4 the order of appearance with regard to the age of the patients.

The prevalence of spina bifida occulta cannot be determined easily and the estimate of 24.6 per cent in Figure 1, is probably too low, since many persons unwittingly carry about this defect and suffer no ill effects. Roentgenologists believe the condition to be so common as to be considered almost a normal variation which usually seems to have little or no bearing on the cause for which the patient was referred for examination. Reflex disturbances, such as absent tendo-achillis reflexes, faulty contour or slight asymmetry in the development of the calves or buttocks, *pes cavus*, and hammer toe, have not been charted, although they are important and often find their explanation in spina bifida occulta, best demonstrated by the x-ray (Figs. 5 and 6). It must be borne in mind that the incomplete development of bone in children under

ORDER OF APPEARANCE OF CHIEF COMPLAINTS OF 187 PATIENTS HAVING SPINA BIFIDA nine years of age makes

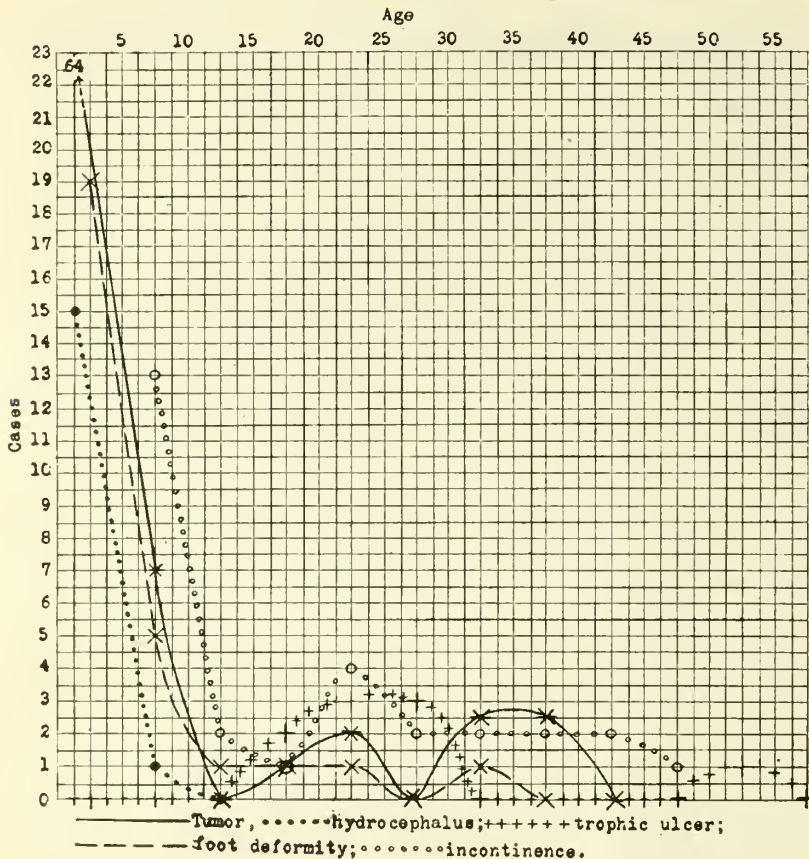


Fig. 4. Order of appearance of chief complaints of 187 patients having spina bifida. (Case 261454.)



Fig. 5. (Case 261454) Roentgenogram of spina bifida of the lumbar region. Note the oblique position of the posterior spinous processes.

their examination by the x-ray unsatisfactory.

Hypertrichiasis (Fig. 7) is, on the whole, not common. Virchow first pointed out the usual association with spina bifida. The Atavistic theory, assuming a reversion to the tail-bearing animals was thus replaced. Von Recklinghausen mentions the possibility that persons having this defect with associated *pes equinus*, so common in spina bifida, supplied the basis for the mythologic conception of the satyr and the early Christian visualization of the devil, the lower part of the body equine and the upper part human. According to Tellman, thirty-eight of forty-two cases (90 per cent) of *hyper-*

*trichosis partialis* were associated with spina bifida. Whether this is due to stimulation from chronic inflammation, as Virchow assumes, is uncertain; von Karwowsky's patient, who developed a hypertrichiasis about the elbow following gonorrheal arthritis, furnishes supportive evidence.

In about 8 per cent of cases the tumor is located in the cervical region; in Figure 8 are shown two spina-bifidous cysts; the lower contained a dermoid.

The sacral dimple, *fossa sacralis* (Fig. 9) is a very common defect. Cramer found it in 40 per cent of two hundred infants. It usually disappears by the age of 12; when persistent, it signifies a developmental sacral defect.

Deformity of the feet, usually club-foot, is one of the most common deformities and may be the result of muscular paralysis. This, however, by no means explains all cases of club-foot. As an instance of hereditary transmission Tub-



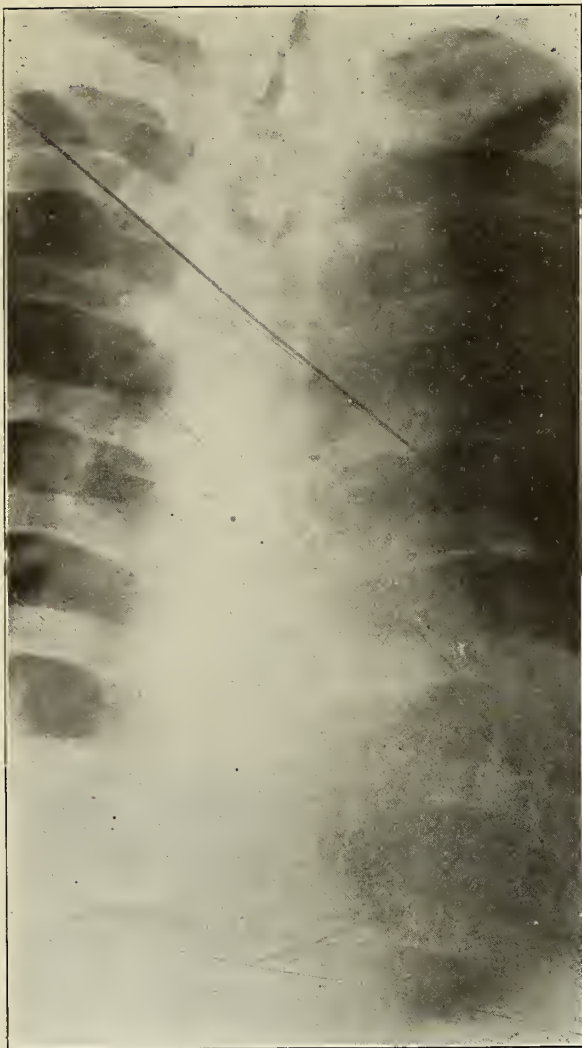


Fig. 6. (Case 316979) Roentgenogram of spina bifida occulta of the upper thoracic area.

by cites Little's case, in which there was transmission of club-foot through the male side for four generations. Club-foot is usually regarded as a developmental error on the same basis and of equal significance with the spina bifida. The theory of the fetus' prolonged retention in a deformed position in the uterus seems well disproved by the occurrence of club-foot in extra-uterine gestations. Peltesohn, whose records unfortunately were destroyed in the war, is of the opinion that club-foot, in the majority of cases, is associated with spina bifida occulta. It was present in the last eight cases which he had seen. Its presence should always be suspected in patients in whom there is a recidivation following operative correction.

The question of congenital dislocation of the

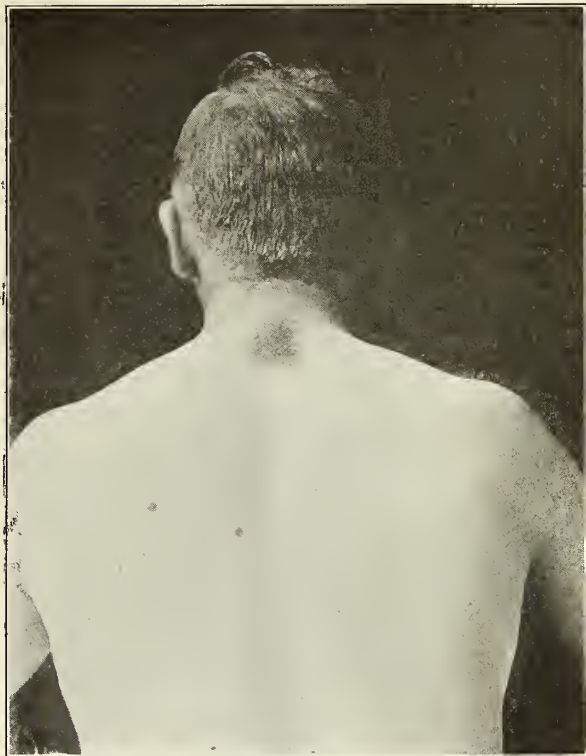


Fig. 7. (Case 280358) Hypertrichiasis over a spina bifida occulta.

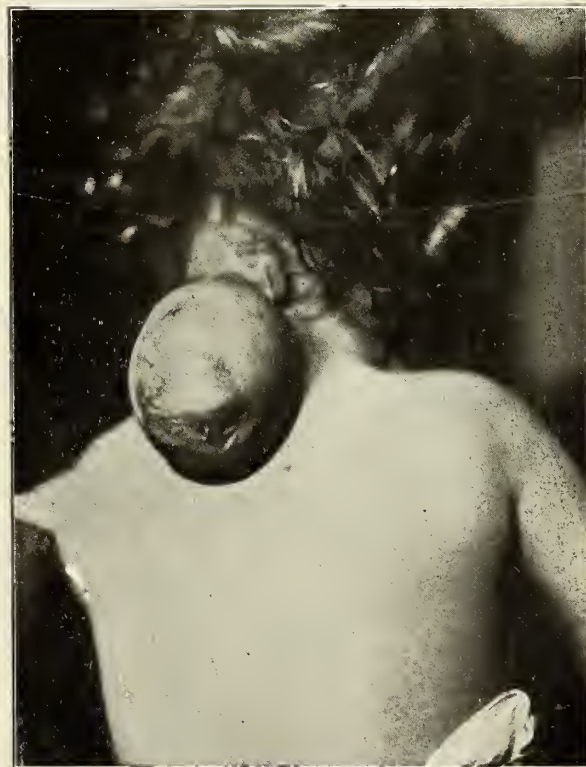


Fig. 8. (Case 213465) Double spina bifida cystica in the cervical region. At operation the lower cyst was found to contain a dermoid.



Fig. 9. (Case 284589) Sacral dimple (fovea sacralis), a very significant defect in spina bifida.

hip has gone through a similar dispute; Lucke insisted that gluteal paralysis is primary, and Joachimsthal that it is simply another expression of multiple defects.

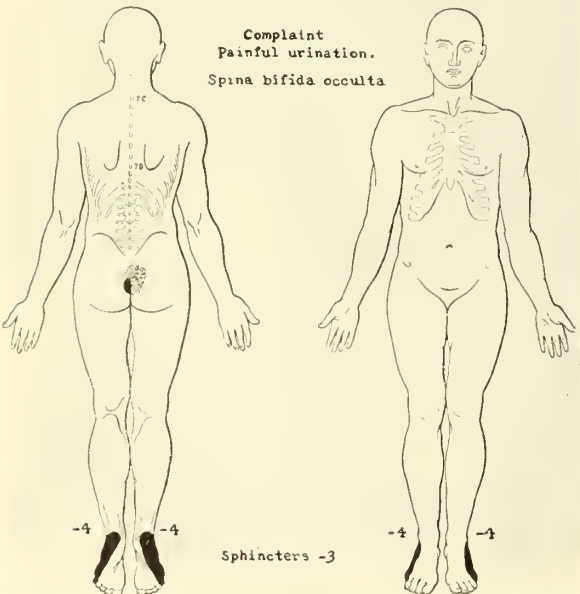


Fig. 10. (Case 263683) Slight degree of sensory disturbance in a case of spina bifida occulta. The perianal distribution is particularly noteworthy.

The paralysis of the muscles involving the lower extremities is usually flaccid. In one of our cases the paralysis of the upper extremities was flaccid and of the lower extremities spastic. The defect in this case was located in the cervical region. In one case a diagnosis of progressive muscular dystrophy had been made and a grave prognosis given. In 5.8 per cent of the cases the paralysis was spastic.

In order to get a better idea of the relative prevalence of muscular paralysis, sensory disturbance, and incontinence, than is possible in young children, forty-nine patients more than five years of age, excluding those with spina bifida occulta (26 per cent) without involvement of the nervous system, were selected and studied as a group. About 84 per cent of the group had evidence of cord involvement. Sphincter disturbances were the most common; they were present in 71 per cent of the patients and constituted the only evidence of involvement of the cord in



Fig. 11. (Case 268003) The patient's only complaint was incontinence. The area of complete loss of the sensibilities of touch, pain, and temperature is enclosed in the line.



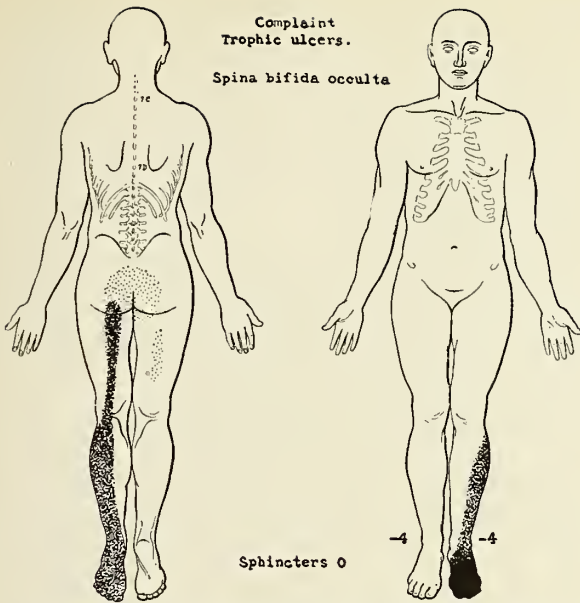


Fig. 12. (Case 310701) Sensory disturbance in a patient who complained of trophic ulcer. No disturbance of sphincteric control.

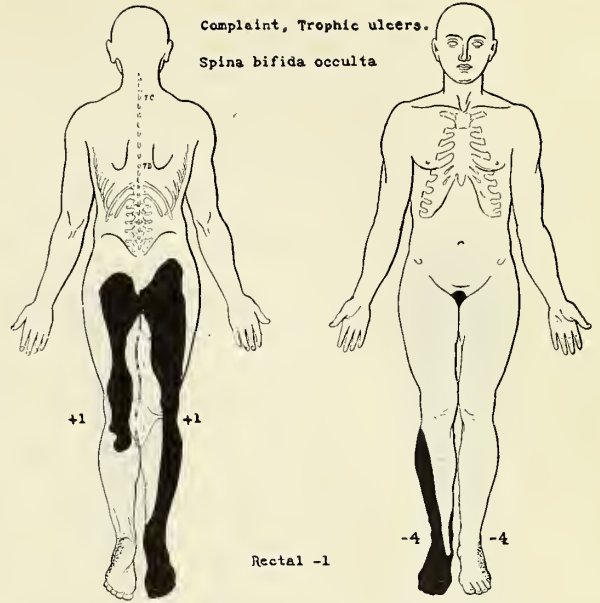


Fig. 13. (Case 240447) Loss of sensation in a case of spina bifida.

14 per cent. Motor paralysis in 53 per cent was the next most frequent finding, and furnished the only evidence of cord involvement in 6 per cent. Sensory disturbances were present in 45 per cent, but in no instance occurred independently. They may be very slight, as in Case 263683 (Fig. 10), and because of their location, easily overlooked.

Incontinence (Fig. 11) is common and while it is not discovered early it soon becomes one of

the leading complaints (Fig. 1); it also may develop later in life, even if the sphincter functions were formerly normal. The association of enuresis and spina bifida has been repeatedly emphasized. Enuresis was noted in only one case in our series, although it was noted a number of times in the family histories of the patients. Peritz found 68 per cent of spina bifida occulta in twenty-two adults with enuresis, and 35 per cent of spina bifida occulta in twenty-two

#### TARDY APPEARANCE OF SYMPTOMS AND PROGRESSIVE LOSS OF FUNCTION PRESENT IN 14.4 PER CENT OF PATIENTS HAVING SPINA BIFIDA

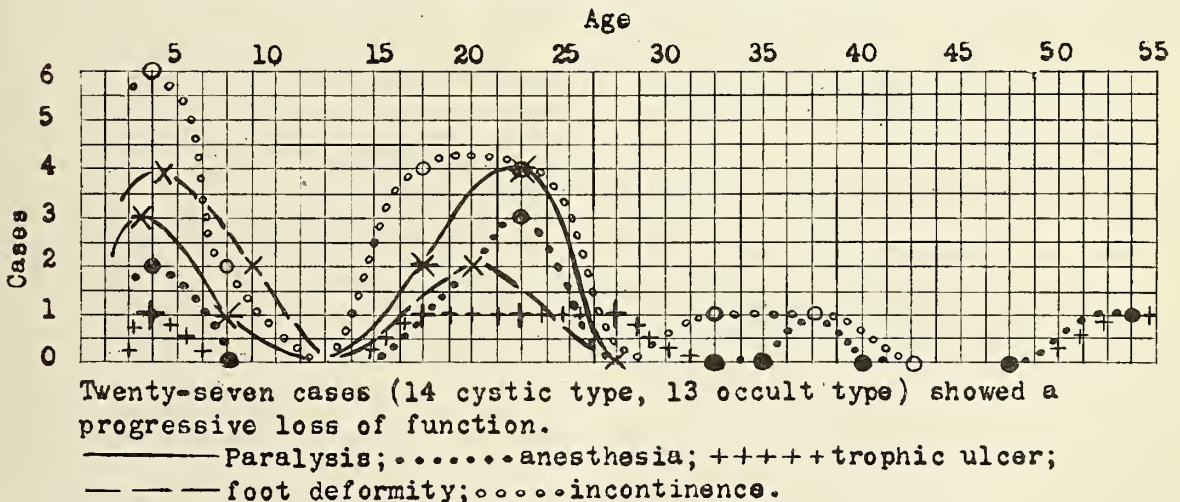


Fig. 14. Tardy appearance of symptoms and progressive loss of function in 14.4 per cent of patients having spina bifida.

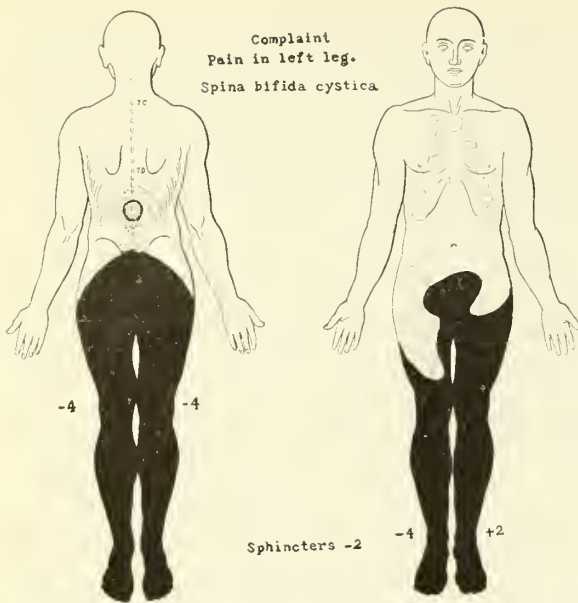


Fig. 15. (Case 264359) Loss of sensibility to touch, pain, and temperature in a case of spina bifida.

children with enuresis. Fuchs coined the term myelodysplasia to explain this relationship. He found associated *pes planus* in 80 per cent of patients with enuresis. The condition is explained on the basis of a paretic internal sphincter (Spieler) or of an anesthetic urethra (Schlesinger). The prominent psychic factor could be explained easily in either case.

All the trophic ulcers noted in the feet ap-

#### OPERATIVE RESULTS IN FIFTY-SEVEN CASES OF SPINA BIFIDA

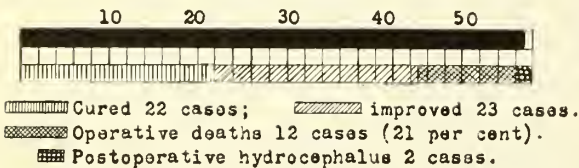


Fig. 16. Results of operation in fifty-seven cases of spina bifida.

peared after the fifteenth year, as Figure 4 indicates. One patient had been treated for a long time for tuberculous arthritis.

#### DISCUSSION

*Case A310701.* Mr. D., Aged 55, came to the Clinic March 30, 1920, complaining of a discharging sinus, which had appeared over the left fifth toe twenty-two years previously. The toe was amputated after one year, but the trouble continued, and four years later another ulcer developed over the left heel, which discharged continually. About this time the patient discovered some anesthesia of the left foot, and loss of sexual power. Three years before examination a third sinus appeared over the head of the fifth meta-

tarsal bone, and two years later fibrillary tremors in the left calf.

Examination revealed a slight general diminution in power of the left limb, no atrophy, but marked fibrillation. The tendo-achillis reflexes were absent. Sensory disturbance for all qualities of sensation were noted (Fig. 12). Sphincter control was normal. A sacral dimple was found and a roentgenogram showed a spina bifida occulta.

*Case A282791.* Mr. E. C. J., aged 19, presented himself August 1, 1919, complaining of an ulcer over the buttocks of one and one-half years' duration. He had never had normal sensation above his feet and had always suffered from enuresis, and three years before the condition had become aggravated.

On examination it was found that both legs below the knees were completely paralyzed; this had led to a diagnosis of infantile paralysis. Internal rotation of the right leg could not be obtained, the abductors of the thigh were very weak, and the quadriceps slightly weak. The left patellar reflex was absent on reinforcement, the right was normal. Both tendo-achillis reflexes were absent. Sensation for all qualities was markedly impaired over the saddle area and the feet. Control of the bladder was lost almost completely, and the anal sphincter was relaxed greatly. Trophic ulcers were present over both buttocks. Spina bifida occulta, involving the fifth lumbar and the sacral vertebrae was demonstrable by palpation and by the roentgen-ray.

*Case 240447.* Mr. N. K., a boy aged 16, came to the Clinic July 30, 1918. He had an ulcer of the right foot of four years' duration. Two scraping operations had been performed on the ulcer, one four years before, the other one year. He had had great difficulty in controlling his urine until the age of ten, since then his control had improved.

Examination showed a slight muscular weakness of all muscles below the right knee. Patellar reflexes were slightly exaggerated, but within normal; the tendo-achillis reflexes were both absent. Sensory disturbances for touch, pain, and temperature are shown in Figure 13. Control of the bladder seemed to be normal, although there was hypospadias, the meatus being closed; the anal sphincter was slightly relaxed, but competent. There was a chronic ulcer over the ball of the right foot. The fifth toe had been amputated. Palpation and the roentgen-ray revealed spina bifida occulta of the fifth lumbar vertebra.

An associated cerebral disturbance of the type commonly seen in cerebral palsy of childhood was present in two cases. In another case, which came to necropsy, the left cerebellar lobe was very small, measuring 2 by 2 cm.; the vermis was replaced by a dermoid. This recalls the cerebellar, medullary, and choroidal defects sometimes associated with spina bifida, in which a portion of one or all of these structures is apparently reduplicated or dislocated into the spinal canal, defects first described by Arnold and Chiari.

The prominence of speech disturbance, (Table 1) in



the symptomatology, usually of a dysarthric type, was unexpected. It should cause no surprise, however, since phonation is a recent acquisition, phylogenetically and ontogenetically, and hence is least resistant to neuropathologic processes (Brauwer). It probably has the same significance that other associated developmental defects have. It is a curious fact that often the symptoms do not appear until in later life (Fig. 14). This is usually due to one of three causes: (1) the most common, traction on the spinal cord, resulting from adhesions between the lower end and the adjacent structures so that the relatively slower growth of the cord than of the vertebral column is interfered with, in which cases the sacral roots may actually run upward instead of downward; (2) superimposed degenerations of the spinal cord, probably based on the biologic inferiority, and (3) superimposed tumors. Superimposed degenerations that cannot be explained on the basis of growth form a very interesting complication and are often extremely difficult to interpret. The following case is illustrative:

*Case A108376.* Mr. J. S., aged 44, came to the Clinic June 18, 1914, complaining chiefly of paralysis of the legs and incontinence. Except for a lumbosacral spina bifida cystica, which had not given him any trouble, he had been in the best of health until eighteen years before, when he had developed a pain in the left groin and began dragging the left foot. This gradually became worse, and by the end of one year both legs were somewhat weak and numb. Crutches had become necessary ten years before examination; four years before incontinence appeared.

Examination showed, in addition to the spina bifida a trophic ulcer of the right buttock; complete paralysis of all muscles of the legs, with the exception of slight movement brought about through the quadriceps, gluteals, and adductors; and complete loss of sensation for touch, pain, and temperature below the level corresponding to the tenth dorsal segment, with a transition zone of about 6 inches above. Laminectomy was undertaken, and revealed a greatly degenerated cord with surrounding edema.

Five other patients gave histories of a similar nature. The youngest patient was 24, the oldest 55. In all of these, the question of superimposed tumor was raised. The course of the disease was progressive loss of function accompanied by some pain in four instances. The histories of these patients, briefly abstracted, are as follows:

*Case A167605.* Mr. R. J. T., aged 24, came to the Clinic July 27, 1916, complaining of impotence. He had been married three months. A sacral dimple with slight bulging above had been noted since birth. The present trouble had begun three years before, with a very slowly progressive loss of power in the legs.

The patient was unable to stand on his heels alone at the time of examination. Fibrillary tremors in the right thigh, slight diminution of all forms of sensation over the outer surfaces of the feet, more

pronounced over the right buttock, and progressive loss of control of the bowel and the bladder were noted. The right tendo-achillis reflex was absent. The x-ray of the spine was negative.

*Case 323248.* Mrs. R. McC., aged 35, came to the Clinic July 7, 1920, complaining of incontinence which had begun twenty years before, and aching in the legs thirteen years before. Paralysis of the left leg occurred thirteen years before, and of the right, three months before.

Examination revealed a sacral dimple, a palpable deformity, and webbed toes. The x-ray was negative. Almost complete paralysis of both legs below the knees and partial paralysis of the left hamstrings and quadriceps were noted. The left patellar and right tendo-achillis reflexes were absent. Rossolimo and Mendel-Bechterew reflexes were positive patellarly, and there was complete anesthesia below the area supplied by the fifth lumbar segment.

*Case A264359.* Mr. C. L. N., aged 30, had had difficulty in starting urine since childhood and became incontinent at 21. He had had pain in the left lower extremity for nine years. Astragalectomy performed five years before gave no relief. Since infancy pressure on a lump over the lumbar area caused pain to radiate down both legs. His right foot had been clubbed ever since he could remember. The left leg had been somewhat weak for the past four months.

Both patellar and the right tendo-achillis reflexes were absent; the left tendo-achillis reflex was increased and Babinski was present. Sensory disturbances are shown in Figure 15. He had some incontinence of the bowel and of the bladder. Roentgenograms showed congenital defects of the second, third, and fifth lumbar vertebrae.

That tumors occur as a further complication of spina bifida is a well established fact. The tumors may be any of those ordinarily found, although fibrolipomas and gliomas seem to predominate; their removal has been accomplished occasionally (Elsberg).

A most interesting type of case is that with an analogous developmental spinal cord defect, or myelodysplasia without bony changes that can be demonstrated either by palpation or by x-ray; this type differs from the type described by Fuchs. It seems paradoxical to speak of this condition as spina bifida, since there is no spina bifida, and yet they clearly belong in this group. Three of the 187 cases were of this type:

*Case A259846.* Mr. J. E. W., aged 20, came to the Clinic February 18, 1919, complaining of incontinence and pain in the right lumbar region. The patient was born with a sinus over the sacrum, which had discharged until four years before. His sister had a similar sinus. He had been unable to control urine well since childhood and had enuresis regularly. Control of the bowel was normal. He had suffered greatly from severe nose-bleeds that were hard to control; there was no family history of hemophilia. He was unable to walk until eight years of age, but since then fairly well.

The patient's head was a trifle hydrocephalic. Over the sacrum was a pigmented depression covered by a few hairs. The urine contained a moderate amount of albumin and pus. Cystoscopic examination revealed a cord bladder, cystitis, pyelonephritis and ureteritis. An x-ray of the spine was negative; no palpable deformity was noted. The patient died of uremia March 15, 1919. Necropsy revealed no abnormality other than those noted on examination, and an incision made over the lumbar and sacral spine showed no bony abnormality; unfortunately the cord was not examined.

*Case 320499.* L. R., a boy aged 3, was brought to the Clinic June 18, 1920, because of paralysis of the legs. The child had been delivered by forceps and had been cyanotic; he cried a good deal the first year. He was bottle fed, sat up alone at one year, and began to speak at two years.

The child was alert mentally and used his hands well. The left leg was completely paralyzed; the right leg was very weak. The left patellar and tendo-achillis reflexes were absent; the right were normal. *Pes valgus* was bilateral. The child seemed to feel tactile and painful stimuli over the legs. He had no control of the bladder and bowel. X-ray examination and palpation of the spine were negative.

*Case A307648.* Mr. J. W., aged 43, came to the Clinic March 1, 1920. He complained of being fatigued rapidly and of spasms in the left calf following severe exertion, which had been noticed off and on for the past five years. The patient used an excessive amount of tobacco; otherwise his habits were good. He denied venereal infection. He had no history of previous illnesses or of enuresis. About two years before examination he had first noticed that the right calf was becoming gradually smaller than the left, but for the last six months there had been no change; he could give no explanation for this atrophy.

General examination and complete neurologic examination were negative with the following exceptions: slightly enlarged tonsils with an occasional plug; moderate hypertrophic rhinitis; periapical infection of one tooth; marked bilateral *pes cavus*, more so on the right than on the left, which had been present as long as the patient could remember, and hypospadias. The Wassermann test of the blood was negative. The spinal fluid test gave a negative Wassermann, a negative Nonne, and contained 2 small lymphocytes to the cubic millimeter. The patient suffered from pruritus of the anus and of the scrotum. There was marked loss of power and atrophy of the right calf, which measured 2 inches less in circumference than the left. The *tibialis anticus*, peroneals, and muscles extending and flexing the toes on the right side were moderately impaired in power. No fibrillary tremors were noted. The right tendo-achillis reflex was absent. Sensation for touch, pain, and temperature was normal throughout, including the perianal area. Vibration, joint, and tendon sensi-

bilities were normal. The vesical and anal sphincters were competent. X-ray examination and palpation of the spine were negative. These findings suggested a progressive cell degeneration of the anterior horn cells superimposed on a myelodysplasia.

The cases of myelodysplasia associated with spina bifida are of importance, not only from the diagnostic standpoint, but also from the standpoint of etiology. Cases of this type cannot well be brought in harmony with the view advanced by von Recklinghausen, that spina bifida is primarily the result of a failure of the mesodermal elements to develop properly, since in these cases the deficiency is evidently ectodermal and cannot be explained by any demonstrable mesodermal defect.

#### PROGNOSIS AND TREATMENT

The prognosis and treatment depend in a large measure on the type of the defect. According to the London Committee which undertook a study of spina bifida, 612 (95 per cent) of 649 patients with spina bifida cystica died in the first year of life (von Lewandowsky). Wernitz states that of ninety children not operated on, only twenty (22) per cent lived to be more than 5. Boettcher (1907) found that operation during the first two weeks of life was almost uniformly fatal. Fifty-two per cent of twenty-four patients on whom he operated died as a direct result of operation; the operative death rate in the most favorable type of case, the meningocele, was 25 per cent. None of the eight patients with myelomeningocele was operated on and all died. Many writers agree with Boettcher in not operating on patients with this type of case. A definite contraindication to operation is an increasing hydrocephalus; when this has come to a standstill and the spinal tumor shows little or no evidence of growth, operation may occasionally be ventured, although even then the mortality is high, 50 per cent. Operations undertaken on the brain in order to relieve the accompanying or resulting hydrocephalus are usually disastrous (Paterson). Ordinarily, patients with a marked paralysis in the lower extremities should not be operated on. Incontinence is usually given as a contraindication, although I have observed marked improvement following surgical interference despite the incontinence. The optimum age for operation on patients with the cystic type of spina bifida is from nine months to two years. The operative mortality in fifty-seven patients, including those with less favorable conditions than meningocele, was 21 per cent (Fig. 16).

The type of operation for spina bifida seems to make little difference. Saving time is a desideratum. There is no necessity of overcoming great pressure and no need of great protection, so that complicated procedures, such as transplanting bone, should be discouraged. Simple closure by a running suture, from the bottom outward is advised after the cord and nerve elements have been freed and dropped back into the canal; this operation has the



advantage of simplicity, speed, and effectiveness of closure. (Beckman and Adson).

Most writers are of the opinion that operation should not be performed routinely for spina bifida occulta; Boettcher, however, believes that exploration should be performed so as to avoid the possibility of later trouble. He represents the extreme view. It seems much better, after instructing the patient, to wait until the onset of secondary changes and then operate before much damage has been done, as Katzenstein advocates. Bibergeil attempted to differentiate the type of cases in which the onset or aggravation of symptoms is delayed; he warned against operation in those cases in which there was a slow development of *pes cavus* and claw toes, since the inherent nature of these degenerations is such that surgery can result in no benefit, and he advised operation in cases in which the symptoms are the result of pressure on the nerve elements, as from tumors and fibrous bands. He does not suggest how these cases can be recognized with any degree of certainty, which in practice is certainly difficult. It seems advisable to give most patients in whom the onset of symptoms is delayed and the disability progressive, the benefit of exploration, since laminectomy in competent hands is now a comparatively safe procedure. Doubtless in a considerable percentage of cases exploration will reveal an irremediable condition, but the number is relatively small, and enough patients will be benefited to make routine exploration well worth while.

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187 patients having spina bifida. (Case 261454.)

#### DISCUSSION

DR. JAMES A. JOHNSON, Minneapolis: This is an extremely interesting subject. It is a subject upon which not a great deal of definite work has been done, except that which comes from clinical experience.

Let us consider for a moment the three theories that come prominently into play. The first is the germinal theory; in other words, embryologic defects. If it is due to these, it must develop very early. For instance, in the cases in which the cord is developmentally defective; in which there are no membranes at all, the condition must come on within the first three weeks of prenatal life. Such cases are

occasionally seen in obstetric practice and are usually born dead.

The other theory, that of increased pressure in the spinal cord, seems to me from a clinical standpoint to be the most tenable theory. In other words, it is either an increased secretion of fluid through the choroid plexus, or it is in some measure a lack of absorption. Which we do not know. It is probable that there is an increase in the secretion. There are experimental and clinical reasons for believing this. First Weed, of Johns Hopkins, has fairly well proven by injecting different solutions in the embryo that the spinal circulation begins at about the seventh or eighth week. Since we know the closure of the spinal canal takes place at this time, it is very easy to suppose that an increase in pressure of this fluid may have a great deal to do with forcing open or with the prevention of the union of the spinal canal. Second, spina bifida occurs most frequently in the sacral region and in the cervical region, and these are the two last places for the spinal canal to fuse. Third, a great majority of these cases have hydrocephalus prenatal, and that this condition increases at a tremendous rate in some instances after they are born, and particularly if you operate on them early.

The environmental theory is interesting; it leads us into the chemistry of metabolism of prenatal life of which practically nothing is known we doubt in time it will be worked out and add a new chapter to medical science.

The treatment is discouraging. In cases which are completely without a membrane, of course there is nothing to do. They are usually born dead. If they are born alive, they will die early after birth. The second class of cases, those that have a thin covering, in which you often have a myelomeningocele or fibers of the cord involved, are often born with other developmental defects, such as talipes, cleft palate, partial or extensive paralysis of extremities. They are not infrequently born with paralysis of the sphincter muscles of both the bowel and bladder. It is useless to do anything with them. Pressure on the meningocele is so great that it soon begins to ulcerate, becomes infected, and they die from a meningitis.

In another class of cases, the 3rd group, in which the meningocele is well covered with normal skin, in which there are no other deformities or paralyses, and little or no hydrocephalus, we may hope for some definite relief from surgical procedures. It is well to remember, however, that they should not be operated early, especially if there is a tendency to hydrocephalus. I have seen these cases repeatedly after early operation rapidly develop a tremendous hydrocephalus and in a very short time terminate fatally. Since there is nothing lost by waiting it has become a definite rule with me not to operate till after two years and in some cases even later, especially if the general health of the child is not good.

Many treatments have been devised, but all are



relatively unsatisfactory except excision of the sac. This in favorable cases, especially when the nerves are not involved, and there is little or no hydrocephalus, has given almost universally good results. After excising the sac the defect in the spinal canal should be covered by bringing the muscles and fascia together from either side.

DR. E. M. HAMMES, St. Paul: Dr. Waltman has illustrated his cases so well with lantern slides and has given us so much information, that very little can be added to what he has said.

I wish to say a few words regarding the surgical aspect. Cases of spina bifida with large tumor and with hydrocephalus, especially if increasing, are only interesting from the standpoint of diagnosis. Surgery offers no hope for these unfortunates as they usually die sooner or later. The only indication for surgery in these conditions is the danger of the sac rupturing with an impending meningitis.

There are two groups of cases in which surgery has been crowned with some results. One class is the simple meningocele, and the other the cases of spina bifida occulta where the symptoms develop late in life. In both of these groups the prognosis as to life following operation is favorable, and the outlook, as far as permanent recovery is concerned, is fair. According to Hildebrand, 39 per cent of these cases make a permanent and complete recovery. The best time to operate is between eight and nine months or two years of age. In these cases of spina bifida occulta, symptoms frequently do not develop until late in life. At operations sometimes one can find nothing but adhesions, the removal of which may be crowned with some benefit.

Leopold reported the case of a girl, 6 years of age, who was perfectly normal at birth. At the age of 6 she had a complete loss of bladder and rectal control. At operation, Leopold found some adhesions which he loosened, closed the wound, expecting no result. After four weeks the patient had complete control of the bladder and rectum, and it was learned subsequently that she had complete control of the bladder function for several years.

## TUBERCULOUS PERITONITIS\*

CHARLES H. MAYO, M. D.  
*Rochester, Minnesota.*

Tuberculous peritonitis is far more common than is usually believed because of the varied manifestations of the disease. The cases in which there is serous effusion may be diagnosed, but the dry forms are often overlooked, the major lesion, often pulmonary, overshadowing the abdominal condition. Evidences of this are the various necropsy reports from sanitariums for

the treatment of tuberculosis. Of 531 patients who died from pulmonary tuberculosis in the Brompton Hospital, London, 4.1 per cent were found to have tuberculous peritonitis; of 300 in St. George's Hospital fifty-six (18.6 per cent), of 197 in the Boston City Hospital, 7.1 per cent, and of 1393 in a sanitarium of Breslau 226 (16.2 per cent<sup>5</sup>). One-half of the 306 children less than fifteen years of age with tuberculous peritonitis were between 3 and 6 (Faldi).

During the last few years there has been much discussion of the varied findings of bovine and human tuberculosis in children and in adults. The English Commission for Investigation of Tuberculosis found the bovine type of bacillus in fourteen of twenty-nine cases; the German Commission found the bovine type in 63 per cent of the cases of abdominal tuberculosis. In New York it was found in forty-four (62 per cent) of seventy-one cases; 25 per cent of the adults with tuberculosis and 69 per cent of the children had the bovine bacillus.<sup>8</sup> The bovine form of the disease is largely preventable by elimination of tuberculous cows. During lactation the udder is essentially an eliminating structure, even though it is not involved locally, just as tuberculosis bacilli are passed from healthy kidneys when the focus is elsewhere in the body. If the udder is tuberculous, numerous bacilli may be found in the milk. Milk from untested dairy cows should be pasturized.

The surgical treatment of tuberculous peritonitis dates from the accidental finding of the disease by Sir Spencer Wells in 1862, who, in operating on a girl, aged 22, for suspected ovarian cysts, discovered the condition; the patient made a recovery, although nothing but the fluid was removed. The next report was that of Konig, in 1884, who treated four cases by laparotomy, removing the fluid, and closing without drainage, with three recoveries. In 1890, Konig reported 139 cases treated, with eighty-four recoveries; twenty-four for more than two years.

Tuberculous peritonitis is not a primary disease but secondary to a tuberculous process or other foci in a contiguous structure. Tuberculosis of the mesenteric glands may ulcerate through the peritoneal surface and deliver caseous material into the peritoneum, causing

\*Presented before the Southern Minnesota Medical Association, Mankato, November, 1920.

diffuse miliary deposits. In adults, tuberculosis may occur in the upper abdomen from tuberculous ulcer of the stomach, of the gallbladder, of the spleen, or of mesenteric glands; in children it usually originates in the mesenteric glands. In children tuberculosis is the most common cause of ascites, although in them peritonitis is often caused by streptococci in the same lymph areas. Hyperplastic tuberculosis of the intestine very rarely causes diffuse peritoneal tuberculosis, except when it occurs as tuberculosis of the appendix which is found in males and females at practically all ages. A stricture at the cecal juncture maintains a pure culture of the bacillus, and ascites occurs. In approximately half of the cases the lesion is confined to the appendix; in the remainder the lower end of the cecum or even the ileocecal valve is involved. The most frequent cause of tuberculous peritonitis is tuberculosis of the fallopian tubes with leakage into the peritoneum; many miliary deposits are found throughout the abdomen; the parietal and visceral peritoneum is studded with them. In the male the complementary structure, the epididymis, is often affected by tuberculosis, but the peritoneum is not involved. Because of this the number of males who develop tuberculous peritonitis from a genital cause is materially smaller than the number of females. The diagnosis is always easy, as in tuberculous conditions there are a great variety of reactions. In acute cases the temperature may be high, while in the cases of more chronic insidious development there is practically no increase in temperature. Albumin appears in the urine in about 50 per cent of the cases and bladder irritability is frequent. A real difficulty in diagnosis is differentiating the ascites caused by rupture of the small carcinomatous ovarian cyst. The small implants of carcinoma on the peritoneum in certain cases greatly resemble miliary deposits.

Only the cases of tuberculous peritonitis with general or local ascites or the cases of the plastic type with pelvic masses are considered surgical. Since most such conditions occur in patients between 20 and 40, the rather rapid onset and distention with great thickening of the peritoneum led to operation in women for presumed ovarian cyst in nearly one-third of the earlier cases recorded by Osler. Operations

for the removal of ascitic fluid, supposedly due to hepatic cirrhosis, has often disclosed a tuberculous condition in patients between 40 and 60, while a large proportion of unsacculated cystic tumors of the abdomen are the result of adhesions surrounding a tuberculous process, usually ulceration over a mesenteric gland, or surrounding the hyperplastic variety of intestinal tuberculosis which is chronic and often accompanied by severe colics and obstruction.

It is estimated that tuberculous peritonitis is relieved by medical treatment, according to Ochsner in 50 per cent of cases, Allbutt and Rolleston believe that spontaneous cure occurs in about 50 per cent. Indications for surgery are not questioned if the cause is due to obstruction from the hyperplastic type of lesion and relief can be secured by excising the diseased segment of intestine, or, if the tumors are found to be too numerous and scattered, by short-circuiting the diseased areas of the intestine to relieve the obstruction. This obstruction, however, occurs but rarely in tuberculous peritonitis with ascites, as in only a few instances does the ulceration cause miliary peritoneal deposits and ascites; the disease represents a special type. There is no question that patients with tuberculous peritonitis have a tendency to recover; surgeons often discover calcified glands in the mesentery, evidence of an old tuberculous lesion, possibly of the bovine type in children, and gross evidence of plastic adhesions, the result of the plastic form of the disease which had occurred years before in young adults with few symptoms.

Admitting that many recoveries follow medical or no treatment, or incomplete surgical treatment such as removal of fluid alone, and it is usually conceded that there are other foci of infection, the question is, Do these patients remain well? So far investigation has shown that a considerable percentage of the patients have died within a few years from tuberculosis. In the early stages of the disease the patients may have ascites following a short period of abdominal colic. The pain can be likened to that with pleurisy, since it is relieved by the development of fluid. In the acute and sub-acute condition a temperature of from 103° to 104° is noted. The pulse varies from 80 to 120. In the more chronic cases the skin is fre-



quently dusky, almost pigmented, especially in emaciated persons, and usually there is loss of weight. The peritoneum is greatly thickened and gives an appearance of increased roundness to the abdomen. A diagnostic feature which I have found practically always is a feeling to the fingers of lobulation of the fat in the abdominal wall, as if small lobules, the size of peas, covered the abdominal muscles. While not indicative of tuberculosis alone, the lobules do indicate chronic inflammation and thickening of the peritoneum.

The early treatment of this condition was considered wholly medical for a time and later, following the first case of Spencer Wells, wholly surgical. The operation consisted in a laparotomy incision, removal of fluid, and closure without drainage; if the surgeon examined the peritoneum he reported all parts nearly equally involved and no reason for removing any area. Some operators irrigated the abdomen with salines, others poured in iodoform and glycerine emulsion, others opened the abdomen freely and exposed its contents to the sun for a few minutes, and warm air was blown over the intestines. American surgeons made the closure without drainage, English surgeons established drainage rather frequently; this practice, however, seemed to increase the risk, through the danger of mixed infection. The *bacillus tuberculosis* was nearly always in pure culture and the presence of mixed infection added greatly to its destructive and chronic character. Some physicians believed that nothing should be done except to remove the fluid, and they considered a trochar a suitable instrument for this. If air was of value, it could be injected into the cavity before the trochar was removed. McGlinn injected oxygen after the removal of the fluid by paracentesis. Such procedures had but little following.

Careful study shows that there is a real principle involved in the origin of the condition; first, it is practically always a pure tuberculosis, the bacilli being carried in the blood stream; second, except in the type caused by the breaking down of a mesenteric gland, a mucous membrane lesion is connected with the peritoneum; and third, the irritation from the miliary deposits is often the cause of an exudate, at first serous, next fibrinous, and finally plastic.

The tuberculous lesion or lupus in the mucosa is a chronic condition. One of the most practical papers which has been written on the subject is that by the late John B. Murphy who called attention to the involvement of the fallopian tubes in tuberculosis with the open, fimbriated ends leaking the tuberculosis contents into the abdomen, and to the fact that practically all other infections close the end of the tube. When the abdomen is opened and the fluid removed, the source of the lesion can often be determined by the confluent appearance of the miliary deposits near the focus and the discrete appearance at a distance from the exuding area. In a few cases, before we realized the importance of the mucous membrane lesion we made a laparotomy in the same patient two or three times for removal of the ascites, and sponged out the fluid with gauze pads. We observed that the serous ascites was changed by operation into a fibrinous ascites and then into a plastic, that the enlarged tubes, if they were the cause in the plastic type of disease, were encapsulated into the culdesac by adhesions of intestine and omentum, that the miliary deposits disappeared as soon as the exudate was confined, and that a caseous mass formed in the tube which was ultimately cured for like a large tuberculous gland. But within five years a number of the patients died of general miliary tuberculosis or pulmonary tuberculosis which was not manifest, or at least not active, at the time of examination. We then began treating the local condition as a focus. If it could be determined that the focus was in the fallopian tubes, the tubes were removed into their insertion in the cornua of the uterus since of a portion was left, secondary small abscesses formed in the muscular tissues of the uterus. I wish to deprecate, however, the removal of the fallopian tubes because of miliary deposits on their peritoneal surface; unless they are enlarged, nodular, and with gross evidence of disease, there is another abdominal focus and the patient will not be benefited by their removal. It is very rarely necessary to remove an ovary, even in extensive involvement of the tubes. The uterus is only involved on its surface during menstrual life. Small ulcerations may occur from surface invasion; involvement of the interior of the uterus may occur before puberty

and the caseous content, discovered years afterward, apparently does not cause tuberculous peritonitis. Patients in this condition do not menstruate. If they have a high temperature,  $103^{\circ}$  or  $104^{\circ}$ , medical treatment should be instituted until the morning temperature is reduced to  $100^{\circ}$  before surgery is advisable as these patients must develop their own tuberculin, so to speak, before repair is active, and early operation may be followed by acute miliary tuberculosis.

Some patients have passed through the ascitic stage and reached the fibrinous and plastic stages of adhesion development when they are first seen by the surgeon. In females a vaginal or rectal examination often discloses a fixed pelvic mass. These patients, although on the road at least to temporary recovery are liable to the development of active tuberculosis in some other region at a later period; we therefore advise abdominal operation to remove the primary abdominal focus if possible, as we may thus remove the overburden which may determine the final result. The uterus, tubes, and ovaries are found buried beneath a mat of intestinal adhesions. The diseased area is approached, not by tearing the intestinal adhesions apart, because although they may appear to be serious, there is no obstruction, but by following the round ligament to the horn of the uterus, a sufficient opening can be made to enucleate the tubes; they are *stiff*, *fibrous*, with caseating content, and readily peel out. It is unnecessary to separate any adhesions except the local area over the tubes. Should an intestine accidentally be torn it must be sutured and held by sutures against some adjacent peritoneal surface for additional protection, or folded on itself, since the abdominal incision should be closed without drainage. Often the contents of the tubes resemble purulent material, but because the lesion is purely tuberculous and these patients have a fair degree of immunity, the wound may be closed with impunity. For this reason total hysterectomy is not indicated either in the ascitic or plastic condition as it may lead to infection and fistulas or a discharging sinus. In closing the abdominal wound the thickened peritoneum and the transversalis are closed by a running suture. The wound is sponged with a tincture of iodine and a layer closure made,

supported by a firm bandage. This method reduces to a small percentage the secondary tuberculous infections of the divided fascia and muscle. Should a fistula occur it is best treated by an occasional injection of Beck's bismuth and iodoform paste. Since patients with tuberculous peritonitis and active pulmonary lesions are usually not subjected to operation, anesthesia may be secured by light ether administration.

If the cecum is not involved in cases of tuberculous appendix an appendectomy will result in cure. If the cecum is involved removal of the appendix frequently leads to a chronic fistula. In a dry peritoneum with tuberculosis in this region resection of the cecum is advisable. Apparently, however, in the hyperplastic type of tuberculosis of the intestine there is as a rule little or no excess of peritoneal fluid, which reduces the dangers of resection. Chronic serous peritonitis is rarely found; it occurs with a greatly thickened fibrosis of the peritoneum, all the mesenteries are shortened, and the thick layer of organized exudate which cannot be removed is sometimes yellow or pearly white. Such chronic ascites is sometimes discovered in the upper abdomen during exploratory laparotomies. The preoperative diagnosis is often hepatic cirrhosis with contraction of the liver, in which the proposed operation is drainage of the peritoneal cavity into the preperitoneal tissues by the use of the omentum (Talma-Morison) but no omentum can be found on exploration since it is completely contracted and covered in by the exudate. Pick first described the condition associated with obliteration of the pericardium by adhesions to the heart, which he considered primary, and the abdominal condition secondary. In one case of Pick's disease I could not find any local focus; the patient died following operation. Concato believes the condition to be abdominal. Some type of chronic infection is undoubtedly the essential etiologic factor. Although tuberculosis cannot be said to be a common cause, I have seen one case of Concato's disease in which there were large tuberculous tubes with fimbriated ends open and filled with caseous and granulomatous material, but without miliary tubercles which would not be expected from the extent of the organized plastic deposit.



In tuberculous peritonitis the prognosis depends on amount, location, activity of the disease, and associated diseases; age is also an important factor. Taylor believes in a fatal prognosis in more than half of the cases of tuberculous peritonitis. This certainly includes advanced gross tuberculosis with the tuberculous peritonitis the minor lesion. Death in many instances should be attributed to tuberculous conditions other than the peritonitis.

From January 1, 1908, to June 1, 1920, 195 patients with tuberculous peritonitis have been operated on in the Clinic, 153 females and forty-two males. One hundred fifty-seven women had tuberculous peritonitis in this period, many the dry or encapsulated form; 8.7 per cent of the latter had pulmonary tuberculosis also. The operative mortality was 1.5 per cent. During the last ten years we have treated medically about 260 patients without surgical indications whose diagnosis was abdominal tuberculosis. Tuberculin is of value in raising the resistance, but should be used in larger doses than generally believed indicated.

#### CONCLUSIONS

We consider cases of tuberculous peritonitis very favorable for cure in most instances, at least if the abdominal condition is the main factor. The possibility of cure of such forms of tuberculosis is due to its being confined where it can be attacked by nature's forces, as a gland is destroyed by disease and undergoes caseation and calcification in the curative process. In areas that can be spared without destruction to life, surgical elimination is of great benefit. Thus nature can cure tuberculous peritonitis in pure form. Mixed infection destroys tissue, but added toxins are destructive to life as well as to tissue and are more chronic and difficult to treat or control. If ascites in tuberculous peritonitis adds so enormously to the surface area involved in a tuberculous process and must be overcome by changes in the peritoneum by changing the exudate from serous to fibrinous and plastic adhesions before cure occurs, such surgical treatment as will hasten the process is advisable. The important question is with regard to the permanency of cure and restoration to health. Death or even ill health rarely comes from obstruction due to the adhesions. When acute obstruction develops it is due to a

single band or the hyperplastic variety without ascites. By removing the focus of disease in tuberculous peritonitis, especially when such a focus involves a tuberculous mucous membrane, a high percentage of permanency of cure with a very low primary operative mortality is secured.

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- " W. J. Mayo J. A. M. A. Vol. XLIV P. 1157

#### DISCUSSION

DR. EMIL G. BECK, Chicago, Illinois: The paper of Dr. Mayo teaches the great lesson of immunity. Why do patients upon whom we operate get well and stay so permanently, where the focus of disease has been eliminated, and why is it that other patients that have been simply explored do not always get well?

We have three kinds of immunity: First, Natural immunity with which we are endowed when we are born, a certain degree of immunity against all disease. If that were not true, we should die from the effects of the first breath we take, for it is laden with germs. Second, We acquire immunity to those diseases to which we are exposed or with which we are attacked. Third, We may produce artificial immunity. We immunize patients by vaccines, by medical treatment, by hygienic measures, and so on. But we may also immunize by surgery, as proven by the paper of Dr. Mayo.

I wish to give an illustration of how disease and immunity try to balance one another during the life of a patient. Let us illustrate this by a fictitious case: if for instance, a patient is afflicted with marked tuberculosis of his right kidney, and his left is also slightly affected, and the bladder also.

At the same time he had scattered foci of the tuberculosis in the lung, and in other parts of the body. During the development of this extensive distribution of the disease the formation of immune substances have tried to keep pace with the progress of the disease, but has not succeeded in developing at a faster rate than the disease, so that the quantity of immune substances is too small of over-balancing the extent of the disease.

For further illustration, let us represent the amounts of immunity and the disease by units and take an inventory of the present status. We represent this in a form of "Debit" and "Credit" account, placing the unit of disease on the "Debit" side, and the amount of immunity on the "Credit" side. Then the table shows that the total of the units of disease are 49, and of immunity 39. Thus the patient is lacking at least ten units of immunizing substances to balance up with the units of disease. But he should have more; he should have a surplus of immunity in order to eliminate the disease. How can this be accomplished in this case?

Although we are unable to increase the immune substances, we are able, to reduce the disease. In this instance, we remove the right kidney, which represents 20 units of disease. By doing this, we change the status of his account. We will have then only 29 units of disease, and 39 units of immune substances, and thus a surplus of ten units in favor of the immunity. The body is brought into a state of SUPER IMMUNITY. A state very favorable for recuperation. The immune substances which are required to keep in check the progress of the diseased kidney, are through its removal released, and, take care of the remaining foci of disease; and thus the diseased foci in other parts of the body will heal spontaneously. The figures are not based on any definite measurements, of immunity and disease, for such measurements do not exist. These figures are merely improvised to facilitate the illustration of a principle. They will not seem theoretical when compared with what actually happens. We find that when we remove a tuberculous kidney, in a patient who has a tuberculous bladder at the same time, the removal of the kidney will, in many instances, produce the spontaneous healing of the bladder which here-to-fore resisted the most painstaking treatment.

Therefore, we see, that in the removal of the tubes there is a great advantage to be gained, provided they are really diseased. They are the foci of the disease, and if we remove them, the patient will likely to be permanently benefited.

DR. CHARLES H. MAYO (closing the discussion):

Dr. Beck brought up the interesting subject of the development of immunity. There is no question that a great majority of us are exposed to tuberculosis and resist it. Every surgeon of experience occasionally in opening the abdomen finds evidences that years before a tuberculous condition involved the glands. On palpation the glands in the mesentery are found to be quite hard, rough, irregular masses of lime, although some may break through early into the peritoneum and be disseminated. In many cases the focus of origin of the tuberculosis cannot be located. The question comes up of the duty of physicians toward the communities in which they live. One of the main things to contend with in the smaller cities and towns is the inspection of cows and meat. In Minnesota only a half dozen cities have any inspection of herds of cattle that are supplying them with milk. I worked two years before I succeeded in getting an ordinance approved to have cows tested for tuberculosis in Rochester, and finally when it was forced through the mayor vetoed it. I then had to call on the women for assistance. If you are trying to clean up a city, or abolish anything that is a cause of the impairment of health of children, never ask the fathers to attend a meeting. They are too busily engaged in business, and they dislike to do anything that might antagonize somebody who trades with them. They would rather sacrifice the children. Only a few men who have any influence will attend the meetings, and they will attend it as they would a moving picture show. You should aim to get the mothers to attend the meetings. Get them interested by explaining graphically, as Dr. Beck did, the destructiveness to children of bad milk and the enormous number of children affected by tuberculosis. People in small cities should have the same right as people have in large cities. They should have good meat, and proper inspection of milk, which is of the greatest importance.

One-half of all the children with tuberculosis who come to our Clinic come from a section of country running west fifty miles. This district is probably badly infested with tuberculous cows. A government inspector of dairies told me that from 12 to 26 per cent of these cows showed tuberculosis on the block. In marked cases of tuberculous peritonitis the abdominal fat feels like a mass of peas in a layer of cotton. The same occurs in carcinoma. It leaves the peritoneum four times its normal thickness, with an increased blood supply, and there are lobulations of fat of this type found in animals of hibernation. They absorb all intermediate fat. It is of special aid in the diagnosis of chronic peritonitis.





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## EDITORIAL

### MINNEAPOLIS CLINIC WEEK

When one stops to consider the vast number of opportunities which present themselves to the medical profession for the dissemination of medical knowledge—medical journals, post-graduate courses, fellowships, conventions, clinics, and the like, it is small wonder that our profession maintains a high standard of achievement. Opportunities present upon all sides, and physicians who do not avail themselves of the same are withholding from their clientele much that is due.

It is important to keep abreast of the times by covering the literature and by attending conventions, but it is a well recognized fact that only by observing the methods of others in the application of their knowledge can one appropriate to one's own uses the most important, scientific facts and methods of procedure so essential to success. Of all methods of acquiring information, observation is by far the best, and the most effective manner of teaching is by demonstration. Thus while our conventions and journals have a place and are highly desirable, they cannot in the very nature of things furnish the doctor the practical post-graduate course that the clinic so satisfactorily does.

The difference is that in one instance the

physician is told, and in the other is shown how things are done. To our profession great credit is due because of the willingness on the part of its members cheerfully to give up to others the information or knowledge which is possessed. If adverse criticism is to be offered, it should relate more especially to the members of our profession who refuse to accept the knowledge offered by clinicians when the opportunity presents. Thus, notwithstanding the fact that it is a universal observation that the physicians who do travel and give up their time in order to obtain such education not only become better physicians, but find themselves well repaid financially for the outlay of time and money.

Minneapolis Clinic Week was conceived with this end in view. It was the first effort of its kind that had been developed in this territory, and it has proved a success from the first. It has not only developed clinicians and taught them to do more careful and scientific work, but has been a stimulus to visiting physicians from all over the Northwest who have attended any of these meetings.

The physicians of the Northwest are to be congratulated on the opportunity presented during the week of April 25th when the Fourth Annual Clinic Week will be held in Minneapolis. A tentative program shows that the committee in charge has outdone even its former efforts and has arranged a program that no one can afford to miss. The date is very happily chosen, coming as it does just after the winter's work and at a time when many will be able to avail themselves of an automobile trip to the city.

Minnesota Medicine joins with the physicians of the Northwest in congratulating the Clinical section of the Hennepin County Medical Society upon this and its past efforts.

### THE REMARKABLE CASE OF MIRIAM RUBIN

How a man morally or intellectually honest can be a chiropractor is beyond comprehension. It is conceivable that a chiropractor may be morally honest but lacking in his inductive and deductive reasoning, but that this is true of the majority is questionable. It seems more likely that the majority are intel-

lectually keen but should be classed with the charlatans.

We are the more confirmed in our opinion by the recent nation-wide advertising being conducted by these individuals. We refer in particular to the advertisement of the miraculous cure of little eight year old Miriam Rubin, of Waukegan, Illinois. Silence is generally admitted to give consent, and in this case silence would give credit to spinal manipulation for the accomplishment of results unobtainable by medical science. If the statements appearing in the advertisement were true, well and good. From start to finish they are false.

The advertisement states that the little patient was afflicted with a strange talking malady, and talked incessantly for two hundred and twelve consecutive hours until a certain meek chiropractor found the second and fifth vertebrae in the child's spinal column out of position and adjusted them. The child is reported to have recovered.

The facts, as disclosed by the American Medical Association, are:

1. The child suffered not from a strange "talking" sickness, but from a form of encephalitis with excitation.

2. The "incessant" talking was in reality intermittent, both before and after the alleged "adjustment".

3. The chiropractic "treatments" did not "cure" the disease as claimed; they had no appreciable effect on its course.

4. The nurse's record shows that the chiropractor gave "treatments" from February 12th to February 23rd, at which time he was dismissed as the patient's condition gave no evidence of benefit from his "treatments". On the contrary, she was complaining of severe pains along the course of her spine. Since then the family physician has had entire charge of the case.

5. The patient is not restored to health; on March 1st she was seriously ill."

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### THE EYE SIGHT CONSERVATION COUNCIL

The medical profession in general heartily endorses any organization whose aim is the betterment of mankind in general. The recently organized "Eye Sight Conservation Coun-

cil" is such an organization. It is a membership organization and plans a nation-wide "save your sight" publicity campaign. While similar campaigning is often overdone, there is no question but that in the matter of neglect, the eyes and teeth are close contestants for the prize.

Of course an aroused interest in the betterment of vision will increase business for opticians, optometrists and oculists temporarily at least. The optical industry is admittedly backing the movement for they will be ultimately benefited. Professional men representing various organizations devoted to health welfare, education and science, are also behind the undertaking. Like so many of these humanitarian movements the activities of this Council will result in less disease and therefore less need for the services of the physician in general.

The personnel of the council appearing elsewhere in this issue indicates the character of the organization. Its work should be of special interest to ophthalmologists.

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## NEWS OF THE HOSPITALS

Dr. George Earl, Vice President of the Mounds Park Hospital, has been absent for some weeks in Philadelphia.

Dr. Geo. H. Freeman, superintendent of the State Hospital at Willmar, made a recent professional business trip to St. Cloud.

Dr. John F. Smith is now House Physician of St. Barnabas Hospital, having succeeded Dr. Bernard Sorore who has taken up a private practice at Barnesville, Minnesota.

The Alumni of Johns Hopkins Hospital held a banquet at the Minneapolis Club and Dr. Cook, of Minneapolis, was elected president of the Northwestern branch.

Dr. P. L. Halenbeck, of Crosby, who for the past six months has been associated with Dr. F. A. Allen, has purchased a half-interest in the Cuyuna Range Hospital at that point.

The Board of Directors of the Miller Hospital met on March 9th when a discussion of finances was held. The hospital is gradually filling up, having enjoyed a very creditable month during February.

A supply of radium has been received at St. Luke's Hospital and X-Ray treatments are now being administered on a more extensive scale. Miss Gilman, of the Beebe Laboratories, has been appointed Laboratory and Pathological Technician. Adah H. Paterson, Superintendent, is identifying herself with



the million dollar drive in behalf of a Nurses' Training School at Johns Hopkins University.

Dr. List of the General Hospital of Minneapolis has withdrawn his resignation, and is again serving in the capacity of superintendent. Dr. Goedel has been placed in charge of the Department of Anesthesia.

As a result of the annual meeting recently held at St. Joseph's Hospital the following officers were elected: Dr. Wm. Davis, President; Dr. Arnold Schwyzer, Vice President, and Dr. Wm. Carroll, Secretary. Cases were discussed after the meeting.

Overtures have come recently to the University of Minnesota from a number of hospitals, looking to a merger of their training schools for nurses with The School of Nursing of the University. Already such an arrangement has been made with the new Charles T. Miller Hospital of St. Paul and negotiations are pending with other institutions.

The primary purpose of this merger is to standardize the education of nurses in the State of Minnesota, while by a system of rotation services in the several hospitals the student will be given a better rounded course of training. The preliminary courses of instruction are to be unified at the University and thereafter a graded system of teaching will utilize these services in the associated hospitals and will result, it is hoped in the output of a high grade of trained nurses both for private and public need. Never has there been so wide an opportunity for usefulness in many fields as presents itself to the profession of nursing today. The cry for nurses has not been quieted but accentuated since the close of the war.

The better to promote this broader educational movement the University will provide housing and board for student nurses from the date of their admission to the school, thus relieving them from the major expenses of self-maintenance during the preliminary course. The tuition fees of \$25 will be continued. Classes will be entered in each quarter. The first course, under the new arrangement, will begin March 30th. Application for registration should be made at once to Miss Louise M. Powell, Superintendent, School of Nursing, University Hospital, Uni-

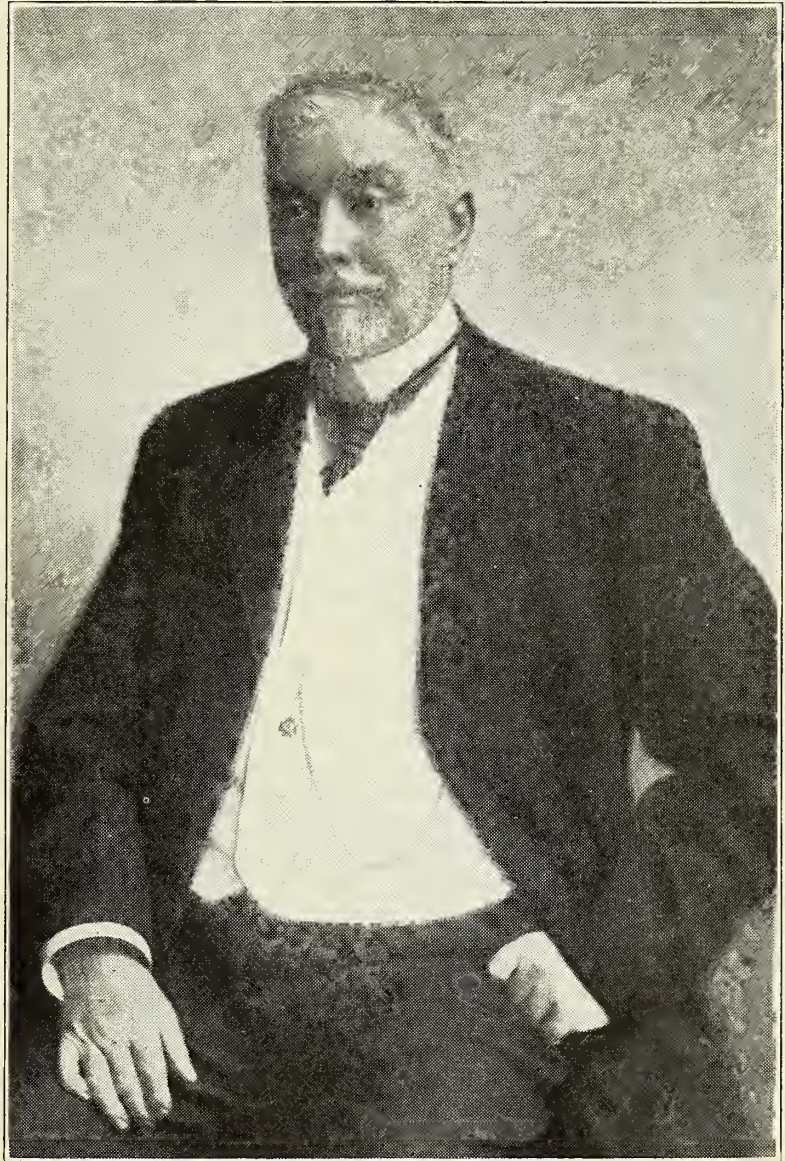
versity of Minnesota, Minneapolis, who will furnish the necessary blanks. High school credentials should be sent to the Registrar of the University. Women of superior education will be especially welcome.

Dr. E. O. Giere of Watertown, S. D. has been appointed Chief of Staff of the St. Paul Hospital, St. Paul, and is opening his office in the Lowry Building. Dr. Giere has been Chief of Staff of the Luther Hospital of Watertown for several years.

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## OBITUARY

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**DR. WILLIAM A. HUNT**

The untimely death of Dr. William A. Hunt of Northfield, which occurred on Thursday, January 27th, represents a heavy loss not alone to family members, friends and patients but to the medical profession.

Dr. Hunt was one of that older group of medical



men who represent and exemplify all that is highest and best in medical ideals and practice. Our state has been fortunate in possessing so large a number of these individuals who have kept alive the finest of the traditions of our profession; men who did not fail to keep abreast of medical progress and made the practice of their chosen profession their chief purpose in life, yet found time to devote themselves to the public welfare and to the support of all institutions and undertakings operating to benefit their community and the commonwealth.

No medical man is so blest in the love and devotion of his patients as the general practitioner and this statement is peculiarly and particularly true of such as practice outside of the largest cities and are able to come in contact with and to know the great majority of their fellow-citizens.

The writer enjoyed the friendship of Dr. Hunt during a period of over three decades and loved and honored him as a capable, conscientious, and public-spirited physician. His kindness, charity, forbearance and understanding were ever in evidence and it is not strange that the entire community is sorrowing over their loss.

Dr. Hunt was born in Northfield in 1858, educated in the public schools of his native town and at Carleton College where he was graduated in Arts (1878) prior to completing a medical course at the University of Michigan from which he was graduated with honors in 1882. Immediately upon completion of his medical training he returned to Northfield and took up the practice of his profession. From time to time he visited the large medical centers for the purpose of post-graduate instruction and never ceased to be alive to the necessity for keeping pace with the enormous advances made during the past three decades in medicine and surgery.

He was one of the strongest and most influential members of the State Medical Society in which he held one of the vice-presidencies at the time of his death. He had been an active and useful member always of the Rice County Medical Society and was a member of the American Medical Association.

His interest in civic affairs and the love which his fellow-men bore him are well shown by the fact that he was twice elected mayor of his city, to which he gave an extraordinarily competent and effective administration. Always keenly interested in educational matters, he served for fifteen years as a member of the local Board of Education and at the time of his death was serving his second term as President of that body.

In 1920 he lost his beloved wife, whose death was a great sorrow and shock from which he never wholly recovered. Several years ago he was informed that he had serious organic disease but in spite of all cautionary advice he continued actively in the practice of his profession and gave little or no evidence outwardly of the extraordinary draft upon his will-power which the performance of his duties represented.

The profession of medicine will be fortunate indeed if it can maintain in its midst from generation to generation such men as Dr. Hunt.

CHAS. LYMAN GREENE, M. D.

Carl V. Malmgren, M. D., Virginia, Minn.—Ills. 1895; aged 54; died March, 1921.

William L. Hollister, M. D., Austin, Minn.—New York 1861; aged 84 years; a member of the Masons, Elks and Minnesota State Medical Association; died Feb. 25, 1921.

Adolph A. Just, M. D., Crookston, Minn.—Ills. 1881; aged 70 years of age; member of the Odd Fellows, Maccabees, Modern Woodman, Masons, and of the Minnesota State Medical Association; died March 4, 1921.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### MINNESOTA STATE MEDICAL ASSOCIATION

The annual meeting of the State Medical Association is scheduled for August 24, 25 and 26th, at Duluth. The scientific program will be held on the 25th and 26th, and any member of the association desiring to take part is requested to communicate at once with the secretary of either the surgical or medical section.

The officers of the Scientific Section are as follows:

#### Section of Surgery

Dr. John T. Rogers, chairman, Hamm Building, St. Paul.

Dr. T. L. Chapman, secretary, 600 Fidelity Building, Duluth.

#### Section of Medicine

Dr. S. H. Boyer, Chairman, 400 Lyceum Building, Duluth.

Dr. Chas. B. Wright, secretary, 302 Syndicate Building, Minneapolis.

### SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The summer session of the Southern Minnesota Medical Association will take place at Winona, Minnesota, on June 27 and 28, 1921. Members of the association desiring to take part in the scientific program should communicate with Dr. Arron F. Schmitt, secretary general, Mankato, Minnesota.

### EYE SIGHT CONSERVATION COUNCIL

This is a recently formed membership organization, formed to acquaint the public with the importance of eye care and to urge the universal eye examinations of school children, workers in industry and clerks in stores and offices.

The following are the officers:

President:—L. W. Wallace, New York City, who is president of the American Society of Industrial



Engineers and recently elected an officer in the newly formed Federated American Engineering Societies.

Vice President:—Cassius D. Wescott, M. D. Chicago, Ill. Chairmen of Committee on Conservation of Vision of the Council of Health and Public Instruction of the American Medical Association.

Directors:—R. C. Augustine, Decatur, Ill., President of the American Optometric Association. Bailey B. Burritt, New York City, General-Director New York Association for Improving the Condition of the Poor. R. M. Little, New York City, Director of the Safety Institute of America.

Board of Councillors:—Dr. Thos. D. Wood, Teachers College, Columbia University. Dr. Frederick R. Green, Chicago, Ill., Dr. W. S. Rankin, Raleigh, N. C., Arthur L. Day, Ph., Washington, D. C., Dr. Allen McLoughlin, Washington, D. C.

Guy A. Henry Times Building New York City is the General Director.

## OF GENERAL INTEREST

Dr. J. J. Donovan, of Litchfield, has gone to Arizona for his health.

Dr. Werner Hempstead, of the St. Cloud State Reformatory, visited Brainerd recently.

Dr. Thos. A. Lowe, of Pipestone, was recently elected County Physician for the ensuing year.

The Miller Clinic, of St. Paul, opened its new offices in the Hamm Building on February 28, 1921.

Dr. B. V. Bates, of Wheaton, is taking post-graduate work in St. Paul with the leading eye specialists of that city.

Dr. Carl O. Estrem, of Fergus Falls, has gone to Chicago where he will take up a short course in X-Ray work.

Dr. V. E. Verne, of Moorhead, has returned from California where he has spent the past two months with his family.

Dr. M. O. Oppegaard, formerly of New London, Minn., is now associated with the Northwestern Clinic, at Crookston.

Dr. G. W. Snyder is leaving Belle Plaine, Minnesota, to become associated with Dr. Plondke, at St. Paul, in medical work.

Admission is granted to graduates or senior nurses of approved training schools who have the necessary high school requirements.

The annual meeting of the Resident and Ex-Resident Physicians of the Mayo Clinic will be held in Rochester, May 18 and 19.

Dr. John Haskins has taken over the offices of Dr. Adams, of Morgan, and will engage in the practice of medicine at that place.

President Ray Lyman Wilbur, of Leland Stanford University, delivered a Mayo Foundation Lecture on botulism, Saturday, March 5.

Dr. L. F. Woodworth, of Le Sueur Center, was called to St. Paul recently by the sudden death of his mother, Mrs. L. H. Woodworth.

Dr. and Mrs. H. P. Dredge, of Sandstone, are in Chicago where Dr. Dredge is taking a month's post-graduate work at one of the medical hospitals.

Dr. M. S. Henderson, of Rochester, and Dr. F. J. Gzenslen, of Milwaukee, recently visited Dr. Steindler at the University of Iowa Hospital, Iowa City.

Dr. Howard S. Clark, of Minneapolis, specialist in diseases of the eye, ear, nose and throat, announces the removal of his offices to 607 La Salle Building.

Dr. G. Carl Huber, Professor of Anatomy of the University of Michigan, gave a Mayo Foundation Lecture, "Experimental Observations on Bridging Nerve Defects."

Dr. Robert Emmett Farr, of Minneapolis, gave an address on Local Anesthesia at the annual meeting of the Brooklyn Surgical Society held in Brooklyn on March 3rd.

An extensive program has been laid out covering the various fields of medicine and surgery. The names of numerous national celebrities appear in the tentative program.

Dr. F. A. Swartwood and Dr. Bernard Gallagher, of Rochester, have formed a partnership and will engage in the practice of medicine and surgery at Waseca, Minnesota.

Dr. Wiese, who has been a Fellow in Surgery in the Mayo Foundation since 1918, is leaving for his home in Christiania where he will practice surgery in the City Hospital.

Dr. Searles, formerly of Lakefield, Minn., has become associated with Dr. I. J. Murphy, Besse Bldg., Minneapolis, who makes a specialty of X-Ray work and radium treatment.

Dr. Lockwood and Dr. Hartman of the Mayo Clinic, have been called to Mexico City by President Obregon because of the illness of General Hill of the United States Army.

Dr. A. F. Schmitt, of Mankato, has been appointed a member of the State Board of Medical Examiners by Governor Preus. Dr. Schmitt succeeds Dr. E. J. Holman, whose term has expired.

Dr. Oliver S. Ormsby, well known Dermatologist connected with the Rush Medical College of Chicago, was a recent guest of honor at a dinner given by Dr. and Mrs. John H. Stokes, of Rochester.

Dr. Arthur E. Guedel, of Indianapolis, has recently opened offices in the La Salle Building, Minneapolis, where he will engage in the practice of General Anesthesia and Anesthetic Consultation.

Dr. Edward Lissack, of Concordia, Missouri, a specialist in ear, eye and throat diseases, will be associated with Dr. H. A. Miller, of Waseca. Dr. Lissack is a graduate of the University of Nebraska.

Rushmore, Minnesota, is without a physician following the departure of Dr. Tiedemann for Heron Lake, where he has entered into partnership with Dr. Chadbourn, who conducts a hospital at that place.

Dr. Henry Houghton, Director of the Pekin Medical School of the Rockefeller Foundation, has left re-

cently for China. He visited the Mayo Foundation Graduate Medical School in Rochester early in March.

Dr. J. H. James, of Mankato, attended a recent banquet given in his honor at the Minneapolis Club, Minneapolis, by the Minnesota Ophthalmological and Oto-Laryngological Society, of which he is a member.

Dr. C. O. Wright, of Luverne, was recently called to Hastings by the very sudden death of his mother.

Dr. C. M. Niles recently returned to Cottonwood where he will engage permanently in the practice of medicine.

Dr. Clifford E. Henry, of Minneapolis, has been awarded a fellowship in the American College of Physicians. He recently attended the American Congress of Internal Medicine at John Hopkins University, Baltimore.

Dr. J. Whitridge Williams, Professor of Obstetrics in and Dean of John Hopkins University Medical School, gave a Mayo Foundation Lecture, "A critical review of twenty-one years' experience with cesarean section," March 10.

Dr. J. P. Chance, of International Falls, has recently received an appointment in the War Risk Insurance Bureau, and will move to Washington, D. C. Dr. Chance served as a surgeon in the World War, and at the time of receiving his discharge held the rank of major.

Rochester recently entertained a large number of distinguished medical men from all over the country who were en route to Chicago to attend a convention on medical education. Dr. and Mrs. W. J. Mayo were hosts at a luncheon which was attended by over a hundred people.

Dr. McRae, who left Rochester February 1920 to enter service with the American Red Cross, has returned to his Fellowship in the Mayo Foundation. He did relief work in France, Belgium, Germany, Latvia, Esthonia, and Finland, and returned to the United States via Norway and Sweden.

Dr. Frederick L. Hoffman was recently a guest of the Mayo Foundation. Dr. Hoffman, who is statistician of the Prudential Insurance Company and author of *The mortality from cancer throughout the world*, has been attending the meeting of the Council on Education of the American Medical Association in Chicago.

Dr. Harry Pratt Judson, of the University of Chicago, and Dr. Arthur Dean Bevan, Professor of Surgery of Rush Medical College and Chairman of the Council on Medical Education of the American Medical Association recently visited the Mayo Foundation to study the methods of graduate teaching employed there.

The Medical School of the University of Minnesota announces short courses for General Practitioners beginning May 2 and lasting until May 28th, 1921.

It is a matter of interest to note that a post graduate course in medicine and surgery at the John A. Andrews Memorial Hospital, Tuskegee Institute, Ala-

bama, is scheduled for the four weeks beginning April 4, 1921.

This work for the development of public health nurses is being done in a very quiet, but effective way and is directly meeting the public need. Already 118 women have taken these courses. Application for entrance should be made to Miss Louise M. Powell, Superintendent, School of Nursing, University Hospitals, Minneapolis.

Professor Gaston Labat, special lecturer on anesthesia in the Mayo Foundation, has just received notice from the Faculty of Medicine of the University of Paris that he has been awarded the medal for his thesis in paravertebral anesthesia in gastrointestinal surgery. This confers on him the title of Laureate of the Faculty of Medicine of the University of Paris.

Dr. Judson and Dr. Bevan addressed the Fellows and Staff of the Foundation. Dr. Judson spoke on the work of the Rockefeller Foundation with special reference to the work in China. Dr. Bevan discussed the facilities for graduate and undergraduate medical instruction in the University of Chicago and stated his belief in the promising future of graduate medical education in this country.

The Soo Line has signified its willingness to put itself at the service of any Minnesota physicians who contemplate attending the A. M. A. meeting at Boston in June, to the extent of quoting fares and schedules, and if the number attending warrants, furnishing a special through-car. Communications should be addressed to H. M. Lewis, General Passenger Agent, Soo Line, Minneapolis.

Dr. Harry B. Zimmerman, of St. Paul, has been appointed Chief Surgeon for the Great Northern Railway. Dr. Warren A. Dennis and Dr. John Rogers are consultants, and Dr. H. E. Hullsick is assistant. The surgical cases will be cared for at the new Miller Hospital in St. Paul. Dr. James A. Quinn, of St. Paul, has resigned as chief surgeon on account of poor health and is spending the winter in Florida.

Dr. Walter R. Parker, Professor of Ophthalmology in the University of Michigan and Dr. Walter B. Lancaster, of Boston, were guests of the Section on Ophthalmology, at the Mayo Clinic last Tuesday. Dr. Parker is chairman of the committee on membership and Dr. Lancaster is chairman of the committee on the scientific program of the International Congress of Ophthalmology to be held in Washington, D. C., in 1922.

In view of the continuing active demand for public health nurses the University of Minnesota will offer a third four months' course in Public Health Nursing, commencing May 1st. This is the first half of the full eight months' course in this subject. Lectures are given in the Medical School and in the Departments of Sociology, Economics, etc. Field work is provided through the rural model practice field in Hennepin County and by the courtesy of the Associated and United Charities of the Twin Cities, the Infant Welfare and Children's Protective So-



cieties, the Visiting Nurses' Association, the Public Schools, and a number of industrial corporations.

The Mayo Foundation entertained three prominent guests the week-end of March 12, Dr. James Ewing, President Vincent, and Dr. Charles Choyce. Dr. Ewing, Professor of Pathology at Cornell University, delivered a lecture, "Newer aspects of the clinical study of malignant tumors." President Vincent, of the Rockefeller Foundation, discussed the activities of the Foundation in foreign fields, particularly China. Dr. Choyce, Professor of Pathology in the University College Hospital Medical School, London, spoke of the evolution of the fulltime teaching in clinical subjects in English medical schools.

The New York Post-Graduate Medical School and Hospital announces that there will be available this year six scholarships under the terms of the Oliver-Rea Endowment. The purpose of the endowment is to award scholarships to practicing physicians of the United States to defray in full the expenses of tuition at the New York Post-Graduate Medical School. According to the wishes of the donor, physicians in the state of Pennsylvania will receive preference in the award of these scholarships. Applications may be sent to the president of the New York Post-Graduate Medical School and Hospital, 20th Street and Second Avenue, New York City.

The following delegates to the Conference on Medical Education which was held in Chicago, March 7 to 10, visited the Medical School of the University of Minnesota March 4 and the Mayo Foundation March 5. Dr. William Darrach, Professor of Clinical Surgery, and Dr. J. W. Jobbing, Professor of Pathology, Columbia University, Dr. F. T. Van Beuren, of New York, Dean A. S. Begg Harvard Graduate School of Medicine, Dr. William Ophuls, Professor of Pathology and President R. L. Wilbur, Leland Stanford Junior University, Dr. William Pepper, Dean University of Pennsylvania, Dr. O. S. Ormsby, Professor of Skin and Venereal Diseases and Dr. G. E. Shambaugh, Professor of Laryngology and Otolaryngology, Rush Medical College, Dean George M. Kober, Georgetown University, Washington, D. C., Dr. D. R. Joseph, Professor of Physiology, Dr. M. G. Seelig, Professor of Surgery, St. Louis University, Dr. N. Allison, of St. Louis, Dr. L. Crummer, Professor of Clinical Medicine, University of Nebraska, Dr. H. E. French, Dean of the University of North Dakota, and Dr. C. P. Lommen Dean of the University of South Dakota.

The University of Minnesota Medical School through the administrative agency of the General Extension Division will offer to the physicians of the Northwest four short courses to be conducted during the month of May, 1921. Each of these courses will occupy the full working time of the student during the period May 2 to May 28 inclusive. The purpose of these short courses is to help the general practitioner to bring his knowledge up-to-date and especially to make him acquainted with recent progress and new procedures, which only the most

painstaking study of the literature of the day can bring out. It is proposed to offer courses in Pediatrics, Obstetrics, Medicine, and Surgery.

*Pediatrics*.—A course in Disease of Children with special attention to the latest ideas on Infant Feeding and the methods of organizing and conducting Infant Welfare Clinics. Recent developments in Pediatrics will be brought out through practical and systematic lectures and clinics. The teaching staff will include some of the leading specialists of the Twin Cities.

During this course a Child Welfare campaign will be outlined and advice and suggestions offered for its efficient conduct and management.

*Obstetrics and Gynecology*.—A practical classroom and clinical short course planned for the purposes (1) of giving a "brushing up" for the general practitioner in his knowledge of Obstetrics and Gynecology; and (2) of presenting recent developments in these subjects so that the general practitioner may return to his practice with the latest views and procedures.

*Medicine*.—Lectures, demonstrations, and clinics covering the newer methods of diagnosis and treatment by specialists in the several fields; diagnosis and treatment of diseases, of metabolism, of the renal disorders, of the anemias, of gastrointestinal diseases, and of mouth infection as related to general medicine; tuberculosis, cardiac disorders, diseases of the spinal cord, encephalitis lethargica, syphilis, and the consideration of some interesting dermatologic problems. A venereal disease campaign will be outlined.

*Surgery*.—General surgery covering operative surgery on cadaver and animal in the surgical laboratories; demonstrations and clinics at the University, Minneapolis General, City and County Hospitals; diagnostic and operative clinics in minor surgery at the Out-Patient department of the University; lecture course on surgery of the extremities; lecture and demonstration course in Proctology. There will also be lectures and clinical demonstrations in Urology, Orthopedics, and Roentgenology.

*Combined Course*.—Practitioners who do not wish to limit their work to one subject may register for a combined course selected from the offerings of the several departments.

*Registration*.—The four courses outlined above will be conducted synchronously during four weeks. Other departments of the Medical School will also put on special work during the time these courses are running, for the benefit of the men who care to take advantage of the opportunity to get some work in other lines. Any physician may register for any one of the four four-weeks courses outlined above, or he may register for any one-week unit of any course. In other words a physician may plan to spend one, two, three, or four weeks at the University and he may follow one line or several lines; it is recommended, however, that he pursue a full four-weeks course. No one of these courses will be

conducted for fewer than six men and not more than twenty registrations will be accepted for any course.

*Fees.*—The fee for any unit four-weeks course is \$30.00. The fee for any one-week course is \$10.00. There will be an extra charge for laboratory material.

*Place.*—Lectures, demonstrations, and clinics will be held in the medical buildings of the University of Minnesota, the University Hospital, and at the various other hospitals of the Twin Cities.

## CORRESPONDENCE

The Duluth Clinic,  
600-700 Fidelity Building,  
Duluth, Minn., March 7, 1921.

Editor Minnesota Medicine,  
St. Paul, Minn.,

I wish to draw your attention to something that might be of interest for Minnesota Medicine. Some days ago a trained nurse, who has been active in the profession for over thirty years, handed to me a clipping from a Duluth paper, that has to do with the report of a banquet of the Minnesota State Medical Society. Unfortunately, the date is not given, and the clipping is somewhat torn. Nevertheless, of striking interest is the reference to the late Dr. Burnside Foster of St. Paul.

There are many men still in the profession who will no doubt recall the meeting, and recall the toastmaster. Some will readily know whether the excellent poem entitled "The Doctor at the Parting of the Centuries" was original with him or not. Those of us who have come on and who knew Dr. Foster only in his later years, still knew him well enough to feel that it was quite within his wonderful powers to have been not only the author but everything as a presiding officer that the reporter acclaimed.

I feel that the clipping is worthy of reproduction because it draws to our attention altogether too poignantly the absence from our meetings in recent years of the late Dr. Foster's type. Whether our medical curricula are too crowded to permit the proper admixture of the historical, the social or the "broad humanities", is difficult to state. Nevertheless, it is an evidence that we should not be proud of, that our regular medical banquets favor far more of caloric hyperbole than the spiritual touch. There are those who will at once fly to the Volstead amendment as the explanation, but this much discussed arid movement is not the answer; this is not a scholarly age.

E. L. TUOHY.

Following is the clipping mentioned:

### THE BANQUET

VISITING PHYSICIANS ARE ENTERTAINED WITH A FEAST  
AT THE SPALDING

The members of the Minnesota State Medical Society were entertained at a banquet given at the Spalding last evening by the local members of the society. It was a very happy affair for the men of the

medical profession are a very genial and fraternal lot of gentlemen. There is a warmth, in fact, a brotherly feeling among them and the annual association with each other is an event which is always looked forward to with pleasant anticipations. The members who attended regularly are the ones who experience the greatest regret at inability to attend. The list of speakers who were to respond to toasts was considerably broken in upon, four of the seven requiring substitutes.

The Spalding served a fine repast and after it had been disposed of by men for whom indigestion seems to have no terrors the feast of reason was given full sway. Flaaten's orchestra played. Dr. Burnside Foster, of St. Paul, was the toastmaster. He is a man of fine presence, excellent composure and presides over a function such as that of last evening with rare tact and grace. His own response was to the toast "The Doctor at the Parting of the Centuries," and he responded in verse as follows:

"To cure their ills and guard the people's health,  
Brings little fame and scarcely more of wealth.  
'Tis rare indeed that on the roll of fame  
We find inscribed the busy doctor's name.  
Nor is it wrought in gold or carved in stone  
Few poets have writ the deeds by doctors done.  
To worship heroes and to sing their praise,  
To tell of love in many different ways,  
Of human happiness and human grief,  
All this has been of poetry the chief;  
And yet methinks, the greatest theme of all  
Has been neglected, and scarce sung at all.  
Who of all men sees most of all these things?  
Who of all men to those who suffer brings  
Most comfort, most relief from pain?  
Whose is the helping hand ne'er sought in vain?  
Ask of yon happy little lad  
Whose legs were crooked and whose back was bad,  
Who made him straight and put his back at rest?  
Ask of some mother at whose happy breast  
A new born babe is held with joy and pride,  
Who sat beside her and to whom she cried  
For help and comfort in her hour of pain?  
And ask her if she ever cried in vain?  
Ask of the soldier back from some campaign,  
To whom he owes it that he's home again?  
Ask him who ran to help him when he fell,  
Who snatched him from the very jaws of Hell,  
Where bullets rained and shells were bursting round  
And dead and dying cumbered all the ground?  
When pestilence and plague with horrid breath  
Are stalking through the land and dealing death,  
Who faces them without a thought of fear?  
Whose is the voice the sufferer loves to hear?  
All these the doctor does, has done, will ever do;  
These are his duties and his pleasure too;  
Not that he loves to see and hear the pain,  
But loves to make the sufferer smile again.  
Loves to wipe tears away, to hush the cry  
Of anguish; or, if need be, make it easier to die.  
And yet they tell us that no doctor's name



Deserves a tablet in the Hall of Fame.  
 What in this Century, now almost dead,  
 Have doctors done? Let History be read.  
 The curse of smallpox for a thousand years  
 And more, had filled the world with tears,  
 Then Jenner came and taught mankind  
 The secret—and the curse was left behind.  
 Not quite behind, for some poor fools refuse  
 The proffered gift and fain would choose  
 To die or suffer and bear horrid scars.  
 Thus ignorance the way of progress bars.  
 Scarce one of us now living can recall  
 The awful tortures of the hospital,  
 When patient's shrieked beneath the surgeon's knife  
 When cruel pain alone could save the life.  
 But, thanks to Morton, Jackson, Simpson, Long,  
 To each some share of glory shall belong,  
 The pain is banished and the knotted brow  
 Of agony, is smooth and peaceful now.  
 Nor was the pain the only thing to fear,  
 The suffering patient had still more to bear;  
 The fevered wound which oft refused to close,  
 Prolonged the period of the sufferer's woes.  
 Then Pasteur, Tyndall, Lister came upon the scene  
 And surgeons learned the art of being clean.  
 These things have doctors done and many more.  
 What of the future? What has she in store?  
 I dare not say—I dare not even guess.  
 And yet I know that it shall not be less.  
 A century is past, and now we stand before  
 The twentieth century's slowly opening door.  
 Then let us vow before the old is past,  
 To make the next more glorious than the last."

President Walter Courtney, of Brainerd, was to have responded to the toast "The Minnesota State Medical Society," but Dr. F. A. Dunsmore was substituted, etc.

[The above poem was written by Dr. Burnside Foster and published in the St. Paul Medical Journal August 1900. Its composition was suggested by the fact that no medical man's name had been suggested in the numerous lists submitted of names worthy to be placed in the Hall of Fame to be erected under the direction of the University of New York. Recently Dr. Morton's name has been placed in the Hall of Fame.—Ed. Note.]

### CORRECTION

Regrettable errors occurred in the article entitled "Electrocardiograms in Thyrotoxic Conditions" by George C. W. Stein, M. D., which appeared in our February issue.

Upper figure on page 84 should read:

Case 1                      Fig. III                      Case 1

Lower figure on page 84 should read:

Case 1                      Fig. IV                      Case 2

Lower figure on page 85 should read:

Fig. III                      Case 8

In the paper entitled "Fractures of the Base of the Radius" by Dr. Roscoe C. Webb, which appeared in

our February number, the following legends were unfortunately omitted:

Fig. 1. X-ray of anatomical specimen with pieces inserted showing the limits of articular surfaces of radius and ulna. Triangular fibro cartilage of ulna can be seen.

Fig. 2. X-ray of anatomical specimen, lateral view. Arrows A B show the normal inclination of the radial joint surface.

Fig. 5. Fracture of base of radius showing altered radial inclination, arrows X Y. Lines A B show the normal inclination.

## NEW AND NON-OFFICIAL REMEDIES

During February the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

**Armour & Co.**

**Corpus Luteum Tablets, 5 grains.**

**David B. Levy:**

**DuBois Iodoleine, Injectable, Ampoules, 2 Cc.**

**E. R. Squibb & Sons:**

**Fat-Free Tincture Digitalis.**

### PROPAGANDA FOR REFORM

**Metol Dermatitis.**—Workers in photographic establishments, especially those engaged in the developing process, are exposed to a number of industrial poisons. In an examination of forty studios in Chicago there were found thirty-one cases of poisoning by metol (the trade name for mono-methyl-para-amido-meta-cresol sulphate), characterized by an erythematous rash of the hands and arms, occasionally involving other parts of the body and giving rise to ulcers. Various methods for the prevention of this dermatitis and for its treatment are published (Jour. A. M. A., Feb. 19, 1921, p. 540).

**Iron Arsenite.**—Ferric arsenite (iron arsenite) rendered water soluble by means of ammonium citrate is known as ferric arsenite soluble. The Council on Pharmacy and Chemistry in 1912 reported that the preparation was irrational and unscientific because "one cannot, in administering this drug, give a useful dose of iron without giving too much arsenic and, vice versa, one cannot give a safe dose of arsenic without giving too little iron" (Jour. A. M. A., Feb. 19, 1921, p. 540).

**Medicinal Use of Whisky.**—In the twenty-four states of the union in which permits for the prescribing of whisky may be issued, there are 112,238 practicing physicians. Of these only 33,379 (29 per cent) have taken out permits. Evidently the remaining 71 per cent do not regard whisky as of enough value in the practice of medicine to go to the trouble of taking out a permit (Jour. A. M. A., Feb. 19, 1921, p. 524).

**Sodium Cacodylate, Arrhenol and Mon Arsone.**—At least three arsenicals not of the arsphenamine type

have in recent years been the subject of some exploitation for use in the treatment of syphilis, namely, sodium cacodylate, Arrhenol (the sodium salt of methyl arsenic acid) and Mon-Arsone (the sodium salt of ethyl arsenic acid). As to the first two, it was shown several years ago that neither had any action on trypanosomiasis or spirochete infection. The inefficacy of sodium cacodylate in human syphilis has been demonstrated clinically. Animal experiments made in the United States Hygienic Laboratory have demonstrated that Mon-Arsone is devoid of any practical trypanocidal action. Many drugs cause temporary improvement in syphilis, but so far only those arsenicals related to arsphenamine have proved of real value and comparatively safe (Jour. A. M. A., Feb. 26, 1921, p. 595).

**Diphtheria Antitoxin and Diphtheria Bacilli.**—The well established curative properties of diphtheria antitoxin must not be confused with its possible value as a prophylactic against the disease. Attempts have been made to apply diphtheria antitoxin locally in the pharynx and nares with the hope of eradicating the objectionable micro-organisms that may have found lodgment there. Recent investigations to determine the effect of diphtheria antitoxin in preventing lodgment in and growth of the diphtheria bacilli in the nasal passages of animals were entirely negative (Jour. A. M. A., Jan. 1, 1921, p. 41).

**Echinacea.**—Intelligent members of the medical profession must be well aware that both the Pharmacopeia of the U. S. and the National Formulary include many products that can scarcely be justified as medicinal on the basis of scientific consideration. Among the products included in the National Formulary is the fluidextract of echinacea. In 1909 a report of the Council on Pharmacy and Chemistry denied echinacea a place in New and Non-official Remedies because there was no evidence to show that it possessed therapeutic value. Despite this, echinacea is used extensively. The fluidextract and the tincture are made in enormous quantities, and the root enters into the composition of a large number of "patent", proprietary and non-secret mixtures. For this reason Couch and Giltner of the U. S. Bureau of Animal Industry made an extensive experimental study of echinacea therapy. Animal experiments designed to determine whether the drug possessed the properties that are ascribed to it gave negative results in every instance (Jour. A. M. A., Jan. 1, 1921, p. 39).

**Serums and Vaccines in Therapy.**—In the development of serums and vaccines, scientific investigation and experimentation have preceded clinical tests of those products which have proved of permanent worth. Whenever the clinical use of serums and vaccines has proceeded beyond well established facts determined by laboratory research, the result, has usually been disappointing. To submit a serum or vaccine for clinical trial without successful preliminary laboratory investigation of its probable worth

is an imposition on the profession. The success of diphtheria antitoxin and antityphoid vaccine has prejudiced the profession and public in favor of vaccines and serums so that they are willing to accept a new serum or vaccine simply because it is a serum or vaccine. In his introduction to a series of articles on serum and vaccine therapy which is now being published by the Council on Pharmacy and Chemistry, Flexner points out that in only a few instances has the anticipation been realized that a curative antiserum for each disease would be discovered. The history of antipneumococcus serum affords a striking example of the difficulties and pitfalls that are encountered in the development of remedies of this class. Thus far only one therapeutically active serum, Type 1, has been developed, and this serum is not effective against infections by other types of pneumococci. Despite this, we are being offered today for clinical use "polyvalent" antipneumococcic serums recommended by the makers for the use in all types of pneumococcus infection (Jour. A. M. A., Jan. 8, 1921, p. 115).

**Polyvalent Vaccines for Colds.**—At least five commercial manufacturers of biologic products make and push the sale of vaccines to prevent colds. Of these at least two, from time to time, have added new strains of bacteria to the formulae with which they originally introduced their products, so that seventy-five or eighty different types of bacteria are now included. Every year different types, varieties and species of bacteria have been associated with colds in different parts of the country. Presuming—although it has never been proved—that any vaccine has value in preventing colds, the logical thing to do is to prepare a specific vaccine for each form of cold in each part of the country. Commercially it is much more profitable to mix all the bacteria together, to prepare a vaccine and to inject this into the patient in the hope that some organism will produce antigens which will find their mates. The present day shotgun biologic mixture is more ridiculous than the old shotgun proprietary—and a greater menace to public health and to scientific medicine (Jour. A. M. A., Jan. 15, 1921, p. 182).

**Helmitol omitted from N. N. R.**—Helmitol is hexamethylenamin methylencitrate. It was introduced with the claim that it was superior to hexamethylenamin (which acts in acid fluids only) in that it is equally efficient whether the urine is alkaline or acid. In 1918 the Bayer Co., which then marketed the product in the United States, was notified that the Council on Pharmacy and Chemistry questioned the claims and desired evidence for their substantiation. In 1919 the same notification was sent the Winthrop Chemical Co., which in the mean time had secured control of the product. Pending the submission of evidence, the Council continued Helmitol in New and Non-official Remedies with the statement that the action and uses were those of hexamethylenamin. Now the Council on Pharmacy and Chemistry announces that Helmitol has been omitted from New



and Non-official Remedies for the reason that the claims under which it was introduced have been disproved by P. J. Hanzlik, who demonstrated that the alkalinity required to split off formaldehyd from helmitol is greater than exists in urine, even in the advanced ammoniacal fermentation (Jour. A. M. A., Jan. 22, 1921, p. 260).

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

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**THE CEREBROSPINAL FLUID IN EPIDEMIC ENCEPHALITIS:** Piero Boveri (Milan, Italy) (Jour. of Nerv. and Mental Dis., Oct., 1920). When the epidemic of lethargic encephalitis made its appearance, early clinical observers noticed the striking fact that in spite of the sensorium changes and other symptoms often appearing in acute meningitis the spinal fluid showed apparently no changes from the normal findings. Dr. Boveri has completed a study of cerebrospinal fluid in sixteen cases. These fluids were taken from the fifth to the thirty-fifth day of the illness. Thirteen of these cases were of the classical type. Two were of the myoclonic type and one was a mixed type. Increase in the pressure of the spinal fluid was very slight. When present, it would occur only in the most acute stage of the illness. The color of the fluid was always clear. As for albumin and globulin content, the strong positive reaction could never be obtained. In two cases a very slight increase up to 0.25 per cent was found. The reducing power was increased in eleven cases and normal in four. Lymphocytosis also was found to be very slight; fourteen per c.m.m. was maximum obtained. A leucocytosis was found in twelve cases, increased to the extent of 4 to 6 per cent only. The author states "All these factors being slight, they can only be detected by most accurate examination, otherwise they may easily pass unobserved."

The following summary is given:

1. The cerebrospinal fluid in encephalitis patients is not to be considered normal.
2. The alternations of the liquid are always slight either in connection with the cytological examination or in connection with the presence of albuminoids, and with reducing power.
3. In all phases of the disease the liquid always shows the same slowness of alterations in its initial phase, however, it shows its anomalies more easily.
4. The different clinical types of epidemic encephalitis (lethargic form, myoclonic form, mental

form) show no particularly characteristic cerebrospinal fluid.

5. The slowness of the alterations and their uniformity in all phases of the disease are facts of great importance, especially in view of diagnosis of epidemic encephalitis, so that it may be possible to differentiate this disease from the different forms of meningitis, particularly from tuberculous meningitis and syphilitic meningitis.

J. C. MICHAEL.

**DIABETES INSIPIDUS, GLYCOSURIA AND THOSE DYSTROPHIES CONSIDERED AS HYPOPHYSEAL IN ORIGIN:** Drs. Camus and Roussy. (Endocrinology—Oct.-Dec., 1920.) "Diabetes Insipidus and that which is termed 'Hypophyseal Polyuria.'"

From a series of animals used in a study of the relation of polyuria to the removal of the pituitary body, the two following cases are selected. Hypophysectomy was practiced on two dogs, the removal being equally complete. One showed notable polyuria; the other not a trace. Autopsies showed in the first case, injury to the base of the brain; in the second, it was intact.

Five operations performed on dogs, on which the region of the base of the brain which borders on the pituitary body was injured with a hot needle (the pituitary body remaining uninjured) resulted in marked polyuria. Two other dogs were operated, removing the pituitary body. The removal was followed by fleeting polyuria. A second operation was then performed at which the base of the brain was injured. This was followed by a more marked polyuria than was seen after removal of the pituitary body. Autopsy showed in both cases double injury to the base of the brain. The duration of polyuria so produced is variable, fleeting or permanent. Some last 15 days, some as long as 8 months. Use of pituitary extracts in no way affected the polyuria.

The lesion which determines polyuria does not concern the pituitary body, nor does its involvement increase or diminish the polyuria. The depth of puncture, involvement of optic thalamus or peduncle, does not alter the polyuria produced. The vital zone is the opto-peduncular region, which lies at the level of the grey substance of the tuber cinereum in the vicinity of the infundibulum. Here a superficial lesion is all that is required. A lesion in front of this zone at the level of the chiasm, or back of it, at the level of the protuberance gives no polyuria.

To determine whether polyuria is primary or consequent to polydipsia, animals were put on constant fluid intake. Polyuria appeared and in some cases the urine increased in volume beyond that of fluid intake. The conclusion was reached that polyuria was primary.

In considering "Glycosuria of Hypophyseal Origin," 45 dogs and 9 cats were operated. Six of the dogs showed light, fleeting glycosuria, lasting no longer than 36 hours, and independent of the polyuria.

In these six cases, no condition was produced at operation nor demonstrated at autopsy which was not repeated many times in the 39 negative cases. The glucosuria in all cases followed rapidly after operative shock. It could not be demonstrated that it was the result of injury to the base of the brain or injury to removal of the pituitary body. Neither did such operations appreciably influence carbohydrate tolerance nor the appearance of alimentary glycosuria, nor was the latter influenced by any of the preparations of whole gland or extracts of anterior or posterior lobes.

ROBERT HELM KENNICOTT

**THE NEED OF EARLY DIAGNOSIS AND TREATMENT OF CHOLEDOCHITIS, CHOLECYSTITIS AND CHOLELITHIASIS:** B. B. Vincent Lyon, (Ann. of Med., July, 1920) emphasizes the importance of a greater knowledge of the physiology and pathological physiology of the first two parts of the duodenum and the secretions (and excretions) of the stomach, liver, gall bladder, pancreas and duodenal mucosa discharging therein, as a means of early diagnosis and differentiation of disease in this part of the alimentary tract.

The use of the duodenal tube has added greatly to our knowledge of diseases of this region, especially of the biliary system, and has made possible earlier diagnosis than by surgical and roentgenological examinations. Likewise, unnecessary surgical interference has been avoided.

Meltzer showed that according to his "Law of Contrary Innervation" the gall bladder could be emptied by introducing directly into the duodenum solutions of magnesium sulphate, this causing a relaxation of the duodenal wall and Oddi's sphincter of the common duct, and permitting the discharge of bile into the duodenum.

The writer found that by introducing magnesium sulphate solution directly into the duodenum, which was previously bile free, he could recover, by means of the duodenal tube, bile which underwent certain definite changes in color and viscosity—"first a light lemon to golden yellow, then a deeper, richer, more syrupy golden yellow, and finally to a very uniformly light lemon yellow, thinner and less syrupy than either of the first two, and that this sequence occurred in all normal cases."

In cases of gall bladder disease the second deep golden yellow bile was replaced by very viscid, deep greenish-black bile, microscopically and culturally corresponding with bile obtained from gall bladder later at operation.

He states, "with certain exceptions, it is possible to drain the gall bladder wholly or partially of its fluid contents; to drain the bile ducts and to obtain bile freshly secreted from the liver cells and to separate these several biles into individual bottles for examination."

The method of procedure is described in detail.

Diagnosis is then developed around the microscopical and cultural study of the bile and the manner of its discharge. Differential diagnosis depends on these studies. This method of non-surgical biliary drainage has been used in the treatment of simple *catarrhal* jaundice, cholelithiasis, cholangitis, cholecystitis, empyema of gall bladder and biliary stasis.

He sums up his article as follows: "This method has already achieved a position of importance in the diagnosis of biliary diseases. In the field of treatment it is certainly the method of choice for 'biliary stasis', gall bladder atony, and in the early stages of catarrh and infection. It may be found to cut down the incidence of stone formation and thus of cancer of the gall bladder. It may decrease the tendency to damage the pancreas and liver. It may have a place as alternative method of treatment for some of the surgical groups, presenting operative contraindications. It certainly is useful as a post-surgical 'follow up' plan of treatment in many cases."

PAUL G. BOMAN.

**ACUTE INFECTIOUS AORTITIS, WITH REPORT OF CASES:** Brown (Ann. of Med., July, 1920) reviews the medical literature on this subject and presents several case reports. He emphasizes the fact that but scant attention is paid to acute aortitis in American medical literature. He refers to many writers, mainly European, reporting cases of acute aortitis, accompanying or following acute infections.

The pathological findings indicate that in the majority of cases the primary involvement is in the media, with secondary extension to the intima, and that the lesions are inflammatory in character. Localization is generally in the ascending aorta. The tendency in most cases is toward repair and restoration of tissue.

The symptoms are essentially the same for all varieties of acute inflammation of the aorta, although in many cases non-existent or very slight. The more characteristic symptoms, according to importance, are:

(a) Pain—This is typical when present, and due to intra-aortic tension. It ranges from feelings of "tightness," "weight" or "pressure" to angina pectoris. In addition to true pain sensations there is a feeling of dread, fear or mental depression. (b) Dyspnea—May be a presenting symptom, and often marked. (c) Cough—Usually present where the affection is subacute or chronic. It may be due to irritation of the recurrent laryngeal nerve or may occur as a consequence of cardiac insufficiency. (d) Vasomotor Symptoms—Mydriosis and myosis are most constant, and are explained on the basis of sympathetic nerve irritation.

The signs given are: (a) Fever—Variable, but resembles the fever course of endocarditis. (b) Changes in Aorta—(1) Lengthening of aorta, producing elevation of arch. (2) Alteration in width. (3) Alteration in contour of aortic shadow. (4) Tenderness to touch. (c) Pain on deep pressure



over sternum. (d) Auscultation—Of questionable value.

The prognosis is generally good and "restitutio ad integrum" is fairly frequent, except where the aortic valves or the myocardium are involved.

The treatment is essentially the same as that indicated in infective endocarditis, and consists of absolute rest in bed, sedatives, and general eliminative measures.

PAUL G. BOMAN.

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## SURGERY

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### SUPERVISORS:

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**PERSISTENCE OF PYLORIC AND DUODENAL ULCERS FOLLOWING SIMPLE SUTURE OF AN ACUTE PERFORATION:** R. Lewisohn (Ann. Surg., 1920, 565 to 599). The author mentions the fallacy of the prevalent idea that an acute perforation of an ulcer of the stomach or duodenum will result in the spontaneous disappearance of the ulcer by simple closure. Some surgeons consider that gastroenterostomy is an unnecessary and rather dangerous procedure in these cases. Operative recoveries are not impaired by immediate gastroenterostomy. Shea reported nine consecutive cases of simple closure without a death. Gibson reported fourteen cases with one death; thirteen of these had simple suture. Deaver, who strongly advocates immediate gastroenterostomy, reported twenty-five cases with one death. The author reports ten consecutive cases without a death; gastroenterostomy was done on eight of these patients. Seven patients were later re-examined. Six on whom gastroenterostomy had been done were entirely well. Simple suture had been done on the seventh patient; he had a persistence of gastric symptoms and operation later revealed a perforated duodenal ulcer, walled off by the liver. Recovery followed gastroenterostomy with pyloric exclusion.

Opposition to immediate gastroenterostomy is usually based on the possibility of spreading infection and undue length of operation. If perforation of the ulcer has occurred the peritoneum is already infected and gastroenterostomy does not spread the infection; if peritonitis is localized, the peritoneal cavity can be packed off. Furthermore, gastroenterostomy is quickly performed, and in acute cases a Murphy button may be used. Immediate gastroenterostomy, especially if associated with pyloric exclusion, brings the advantages of simplified after-treatment and the curative effect on the ulcer. Simple closure of the perforation fails to cure in a large number of cases. The author cites four such instances in detail. All the patients had had simple

closure of the perforation and drainage of the peritoneal cavity. In two cases the symptoms persisted for eight and five years respectively, with prompt relief following gastroenterostomy and pyloric exclusion. In one patient the ulcer was excised; a definite ulcer was not found in another, probably because of extensive duodenal adhesions. Drainage of the peritoneal cavity following closure of the perforation is apt to cause adhesions between the pylorus and duodenum and the anterior abdominal wall; gastroenterostomy, however, will safeguard proper drainage in spite of adhesions.

Closure of the perforation, gastroenterostomy, and pyloric exclusion should be the method of choice in the treatment of perforated pyloric and duodenal ulcers.

H. W. HUNDLING.

**GENERALIZED OSTITIS FIBROSA WITH MULTIPLE CYST FORMATION:** Dr. Ernst Wehner, (Forts. a. d. Geb. d. Roentgenstrahlen, Band XXVII, Heft 2.) Since the original observation by Frourieips in 1842, there have been twelve cases reported in the German literature, of generalized ostitis fibrosa with multiple cyst formation. These are tabulated by the author, with short data concerning the sex, age, most important clinical findings, the site of the cysts, and the histologic findings in the diagnosis of the fundamental bone pathology.

According to the more recent knowledge, these cases would probably all be classified as a generalized form of ostitis fibrosa (von Recklinghausen). In addition, the author presents a case of his own in which he had the opportunity of studying the lesions at intervals of five years.

The patient was a girl, twenty-one years old. At the age of ten months, the patient had rickets. Although as a child she was over-normal in size, she was able to walk first at the age of twenty-one months. At three and a half years, she stumbled over a hazelnut and fractured her left femur. This healed promptly. At the age of ten years, the patient began to limp. The menstrual periods began first at nine and three-quarters years. The patient injured the left femur through falling several times, and suffered considerable pain. Since that time, she gradually improved, until she was practically free of symptoms when she first presented herself for examination in 1914. The roentgen examination at that time showed multiple cyst formation distributed throughout the greater part of the skeletal system. The cysts varied in size from a linseed to a hen's egg. These were associated with structural changes of the bone tissue, there being poorly defined borders between the medullary and cortical portions of bone. The cortex showed thinning and rarefaction and in some places swelling was so marked as to cause the disfiguration of bone.

The roentgen examination in 1919 showed no change except for new cyst formation in the sternum. The old cysts remained the same size. There apparently

had been no attempt at healing, notwithstanding which the patient was entirely free from symptoms during the entire five years.

The author suggests that in this case there may be some relationship between the bone lesions and the infantile rickets, or further it may bear some relation to the disfunction of the ovary as was expressed by the abnormally early onset of menstruation.

The striking feature is that during five years the lesion showed no progress, although at the same time there was no attempt at healing.

With reference to the prognosis, the fact is mentioned that during pregnancy this type of lesion is apt to progress and change over into the more severe form.

R. G. ALLISON

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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**THE DISTRIBUTION OF ADENO-MYOMAS CONTAINING UTERINE MUSCOSA:** Thomas S. Cullen Arch. of Surg., Vol. 1, No. 2). It is not possible to adequately review this exhaustive study in the space here permitted, but every surgeon interested in gynecology should read the original article. One is impressed by the widespread distribution of this form of newgrowth. Detailed descriptions are given of a large variety of such tumors, from the authors collection. They have been found in : 1. body of the uterus, 2. recto-vaginal septum, 3. uterine horn and fallopian tube, 4. round ligament, 5. ovary, 6. utero-ovarian ligament, 7. utero-sacral ligament, 8. sigmoid flexure, 9. rectus muscle, 10. umbilicus. Wherever found, the structure is characteristic. The growth is diffuse, not encapsulated and has a tendency to reach the surface of the invaded organ. Here it stimulates adhesions or extends to neighboring structures. This is most evident in the recto-vaginal septum. Microscopically, there is found, diffuse myomatous tissue with spaces of varying size, lined by columnar uterine epithelium resting on typical stroma. The cavities contain blood, fresh or broken down, forming the characteristic chocolate colored fluid. These areas share in the regular premenstrual congestion, causing increased pain typical of this condition. Operative removal must be complete. Otherwise there is recurrence with widespread growth.

ARCHIBALD L. McDONALD.

**TREATMENT OF ABORTION:** Hillis (Surg. Gyn. & Ob., Dec., 1920). Two hundred cases of septic abortion were treated in two equal groups, of which

one hundred were curetted and one hundred received only constitutional therapy. The latter patients showed lower mortality, fewer complications, less fever, and shorter average stay in the hospital. 122 cases of non-infected or afebrile abortions carefully studied, demonstrated that : (a) 63 per cent occurred between the second and fourth month and 75 per cent of these were incomplete, (b) 31 per cent were criminally induced and therefore potentially infected, (c) 5 patients who were discharged without having been curetted, returned because of excessive hemorrhage. He concludes that patients with septic abortions should receive no local treatment till they have been afebrile for five days, except in case of severe hemorrhage. 2. Such an afebrile period converts a septic case to a nonseptic one, which should then be curetted as a routine because; (a) 40 per cent of such patients treated expectantly have to be curetted later. (b) Curettage insures an empty uterus and prevents subsequent bleeding. (c) It shortens the stay in the hospital. (d) It is relatively harmless in comparison with the good accomplished.

**INDICATIONS FOR OPERATION IN SPREADING PERITONITIS OF POST-ABORTAL AND POST-PARTUM ORIGIN:** J. O. Polak, Am. Jour. Ob and Gyn. Nov., 1920). This excellent description of the pathology of these infections, explains the tendency for the process to localize in the pelvis and cul-de-sac of Douglas. The infection reaches the pelvis through the tubes or para-metrium and remains in this region until the period when the uterus has become an abdominal structure, due to adhesions of the sigmoid and omentum shutting off the process. This tendency is enhanced by the Fowler position or "Gatch Frame," but may be seriously disturbed by meddlesome local treatment. In the post-partum type of infection there is less tendency to pelvic localization or collection of septic material in the cul-de-sac.

Clinically, extension of the process in the peritoneum is characterized by: elevation of temperature, rapid pulse, leucocytosis, with increase in the percentage of polymorphonuclear cells, abdominal pain and distention, with local tenderness. Proper treatment includes; Fowler position or Gatch frame, ice-bags, morphine and proctoclysis and is usually followed by improvement. Spreading peritonitis may be due to unusual virulence of causal bacteria, poor resistance, and imperfect localization. It is associated with: increased local symptoms, higher temperature, rapid pulse, rise in leucocytosis and percentage of polymorphonuclear cells. Polak accepts this complex as indication for surgical drainage, even in the absence of a definitely localized fluctuating mass. This should be secured early in the course of the process, while resistance is still good. In the post-abortion cases the cul-de-sac is opened through the vagina, while in those occurring post-partum with a larger uterus the general abdominal cavity is drained



through one or two stab wounds. Conservative treatment is then carried out.

**INTRA-UTERINE THERAPY IN POST-PARTUM INFECTION OF THE UTERUS:** Henri Vignes (Gyn. et Obste., *Revue Mensuelle* Vol. 2, No. 3.) The author notes the present tendency to avoid all intrauterine therapy and traces the evolution of ideas in practice at the Baudoloue clinic. In 1894, of 123 women with such infection, 85 were treated with intrauterine douche or irrigation and 38 were curetted. In 1909 Pinard concluded "that curettage is rational only in exceptional cases." During 1919 in the same clinic there were but two cases who received any intrauterine measures, namely: digital exploration and douche.

Observation of war wounds brought out two principles: 1. Streptococcus infection of wounds is particularly resistant to local treatment. 2. The only local measure of any value is early and complete excision "en masse" of the area of infection, which in this case would mean hysterectomy. Local measures commonly employed are: Curettage, digital "cure" (cleansing), local application or packing with antiseptics, and irrigations.

Curettage aims to do away with the focus of infection. Retained secundines and clots are removed, but these are relatively unimportant as regards severe infections. Removal en masse of the endometrium involved, has been proven to be impossible, and experience with war wounds teaches that the slightest remnant of infection, leads to rapid extension. Curettage is habitually followed by a rise of temperature, as noted by many French observers, due to massive absorption of toxins through vessels opened up by the curet. It is impossible to prove that the apparently favorable course after curettage is in any case due to that procedure while many of the unfavorable sequelae were undoubtedly due to the operation.

As regards the significance of the bacteria present he concludes: 1. The cases classed as due to saprophytes are mild and do not demand active local measures, especially those which might introduce virulent organisms. 2. Such cases are rare and differential diagnosis is most uncertain. The late complications: parametritis, thrombophlebitis, and general sepsis are more common in cases which have been curetted.

Digital cure or cleansing is usually considered as the most efficient and the least harmful, but the author believes that this procedure is more difficult and is accompanied by much trauma to the infected uterus and surrounding structures.

Direct application of antiseptics: alcohol, creosote in glycerine, iodoform, iodine, on gauze presents the same objections as does curettage and is not as efficient in removing debris. Experience with war wounds teaches that there are no antiseptics which kill bacteria on an infected surface without killing tissue cells, and that most of these agents destroy

the protective cells without killing all of the organisms.

Intra-uterine irrigations are the least dangerous but the most abused of all local measures. They have been advised by good authority, (Tarnier), on the first indication of fever or fetid lochia. However, there are many primary bad effects: reflex syncope, penetration of fluid through the tubes, gas emboli, perforation of the uterus, and usually an elevation of temperature. Good effects are uncertain and not greater than can be obtained by an ice-bag. Obviously it can accomplish little of value and presents many possibilities for extension of sepsis. He concludes. 1. In cases of postpartum infection, except where there is retention of placental fragments, it is dangerous and useless to invade the uterus, after the first week. 2. Digital cure, and local application of antiseptics should be absolutely discarded. 3. Intra-uterine irrigation with antiseptic solutions may be justified in case of retention of debris and clots if done early and not repeated. Most often it is useless. 4. Curettage as practiced by many men under similar conditions, is considered as useless and dangerous especially in cases of streptococcus infection.

ARCHIBALD L. McDONALD.

**HYSTERECTOMY IN THE LANKENAU (Formerly German Hospital):** John B. Deaver (Ann. of Surg., Jan., 1921.) This is an interesting presentation of the practice of the general surgeon, and comprises the work for 1919 as follows: 46 complete, and 84 sub-total hysterectomies, with two deaths. Complete hysterectomy was done for 7 uncomplicated fibroids, 14 complicated fibroids, and 10 prolapse of the uterus, the remainder being cancer of the cervix or fundus. There was one fatality due to myocarditis. This operation is preferred for patients near or past the menopause, or when there is doubt concerning the endometrium. The author uses a clamp on the vagina, which is then divided with a cauter and closed with sutures. In both the total and subtotal, the broad ligaments are fastened to the stump and the surface then well covered with peritoneum. Deaver has no hesitancy in making a transperitoneal hysterotomy for exploration or to remove submucous fibroids. For large low cervical tumors, he advises preliminary amputation of the fundus to simplify enucleation of the cervix and tumor. In complete hysterectomy the ureters are exposed back in the broad ligament so that they are in view while the vessels are ligated. He prefers hysterectomy to myomectomy for large intramural or submucous tumors.

During the same period radium was used for 58 cases as follows: Cancer cervix 39, cancer fundus 12, myomata 5, chronic endometritis 2. There was one fatality. He is much impressed with the destructive action of radium, purulent infiltration, gangrene or ulceration. The histology of such effects is described in some detail. There is no question

that radium will control bleeding and with the X-ray will reduce size of fibroids, but one must consider the effects of the absorption of necrotic tissue. Deaver has records of four deaths due to peritonitis, pelvic suppuration, and enterovaginal fistula following radium. For cancer of the fundus, and operable cancer of cervix the author prefers radical hysterectomy.

ARCHIBALD L. McDONALD.

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## ROENTGENOLOGY

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### SUPERVISORS:

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**PAPAVERIN IN THE ROENTGEN DIAGNOSIS OF GASTRIC LESIONS:** Dr. Sigmund Szerb and Dr. Vidor Revesz, Budapest; (Forts. a. d. Geb. d. Roentgenstrahlen, Band XXVII, Heft 2.) The cases of delayed emptying time of the stomach which are met with in routine roentgen examination can be classified into two main groups on a basis of their morphology and motor peculiarities.

The first group consists of cases with weak musculature and an atonic stomach in which the peristaltic contraction is superficial and sluggish, and the emptying time is not complete within three or four hours, but requires from four to six hours or even eight to twelve hours.

In the second group belong cases with vigorous and rapid peristalsis, even more vigorous than is found in normal stomachs. In these cases, one is apt to find a more or less degree of dilatation. The delayed emptying time is due to either organic obstruction or to pylorospasm. Pylorospasm, in these cases, is not always due to a lesion of the stomach or the cap, but may be secondary to hyperacidity, hypersecretion, cholelithiasis, appendicitis and other extragastric pathology.

The use of papaverin in the differential diagnosis of pyloric stenosis and pylorospasm was first recommended by Holzknecht and Sgalitzer in 1913. Since the original publication, the authors have had the opportunity of using papaverin in two hundred and fifty cases. Of these, one hundred and seventy-six cases were thought, from a clinical standpoint, to represent pyloric stenosis. From a study of these cases, they come to the following conclusions: First, that if a delayed emptying time returns to normal after the administration of papaverin the possibility of an organic stenosis can be ruled out; second, if the delayed emptying time remains unchanged, or if, in the presence of vigorous peristalsis, it is increased, it is proof of the presence of an organic stenosis; third, if a slightly prolonged emptying time remains unchanged, one can conclude that a slight degree of stenosis and pylorospasm is present, but

should convince themselves of the correct diagnosis by repeated clinical and roentgen examinations.

They found the use of papaverin of no avail in the differential diagnosis of a spastic and organic hour-glass contraction of the stomach, nor in the differential diagnosis of spastic and organic contraction of the cardia. They recommend the use of papaverin as an antiemetic in cases which persistently vomit the contrast meal.

For diagnostic purposes, they use 0.08 papaverin hydrochloride (merk), one hour preceding the roentgen examination.

R. G. ALLISON.

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**NEW ROENTGENOGRAPHIC TECHNIQUE FOR THE STUDY OF THE THYROID:** George E. Pfahler, (Am. Jr. Roent., Feb., 1921, p. 81.) The author devised this technique for the study of the thyroid in order to record the change in the size of the thyroid gland following roentgen therapy for hyperthyroidism. Incidentally it was found that it afforded an admirable method for showing the pressure on the trachea and oesophagus by posterior enlargements of the thyroid which were not determinable clinically.

The examination is made with the patient in the standing posture. The position best showing the outline of the tumor is obtained fluoroscopically. The patient's sternum and the anterior portion of the neck is pressed strongly against the fluoroscopic screen. The chin is turned toward the side on which the enlargement is most marked and tilted upward as far as possible. This draws the thyroid up into position where it can be shown on the plate. One's aim must be to get a good lateral view of the neck, but both shoulders should be as nearly as possible in contact with the plate. The tube plate distance is 25 inches. The tube is centered midway between the lower border of the jaw and the upper border of the clavicle and centered directly over the thyroid. The exposure will vary from 3-4 to 1 1-4 seconds, using duplitized films with double intensifying screens, depending upon the thickness of the patient's neck, with 35 milliamperes and a 5 inch gap.

R. G. ALLISON.

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**GLYCOSURIA DURING PREGNANCY:** Roland S. Cron. (Amer. Jour. of Ob. and Gyn., Vol. 2, No. 3, Dec., 1920.) Under this caption the author presents one or more case histories of each of the following clinical conditions: Lactosuria, Alimentary Glycosuria, Renal Diabetes, Diabetes mellitus and Syphilis, and Diabetes Mellitus, all occurring during pregnancy.

After a discussion of each condition as a complication of pregnancy, the author offers the following summary and conclusions:

(1) A positive reaction with Fehling's solution during pregnancy does not necessarily indicate the existence of diabetes mellitus but is usually due to



a lactosuria or alimentary glycosuria and rarely to renal diabetes.

(2) Lactosuria is common during both pregnancy and the puerperium. It is entirely physiologic and must be differentiated from the various types of glycosuria.

(3) A large number, 30 to 50 per cent of pregnant women are less tolerant to glucose than non-pregnant individuals. They have no hyperglycemia and are not true diabetics.

(4) Glycosuria may be due to a lowering of the renal threshold for sugar. Albuminuria and glycosuria may accompany one another or alternate without hyperglycemia.

(5) Diabetes and albuminuria may accompany one another. This complication in pregnancy is an ominous one and calls for the immediate interruption of pregnancy.

(6) Diabetes and syphilis may complicate pregnancy. The treatment indicated is both dietary and antiluetic.

(7) Pregnancy may occur in diabetic women or diabetes may become manifest during pregnancy. Either is a serious complication. Many patients do perfectly well, but a considerable percentage die in coma or collapse or succumb to some intercurrent infection or die during successive pregnancies.

(8) The fetuses of diabetics, leaving out of consideration abortions and premature deliveries, are stillborn or die within a few days following birth in about 50 per cent of the cases.

(9) Fat is the most important factor in the production of acidosis. It should be reduced to a minimum or omitted entirely. Its only use is in bringing the caloric requirement of the patient up to normal.

(10) If sugar appears to a slight degree in pregnant women it should be carefully watched and controlled by diet and, unless a carbohydrate equilibrium can be maintained, pregnancy should be terminated. The advantage of Caesarean section under gas-oxygen should be kept in mind.

ALBERT G. SCHULZE.

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## PEDIATRICS

### SUPERVISORS:

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ROY N. ANDREWS,  
MANKATO CLINIC, MANKATO.

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### CONCERNING DIRECT SMEARS IN DIPHTHE-

RIA: Adrien Bleyer, (Am. Jour., Dis. of Child., Nov., 1920): It is interesting to note how widely divergent have been the experiences of clinicians concerning the usefulness of direct smears in diphtheria. The inherent difficulty, it seems, lies in

the fact that grown on living tissues, the diphtheria bacillus appears in a great variety of forms, and that these stain indifferently and are, therefore, not so readily distinguishable as when obtained in culture. So in the present study we decided to ignore all of these types which were not overly familiar, and sought to determine some readily distinguishable form which would repeat itself sufficiently often to make search for it worth while.

The material from seventy cases of diphtheria were used. Specimens were secured from the membrane itself rather than from its surface because diphtheria bacilli are more often caught up in it than pushed up on it. Bits of membrane were detached with forceps and crushed between the cover slips in a hope of finding the germ. Of several stains tried Ponder's and Greenthal's seemed to serve better than others. Greenthal's stain is an acid stain in which the crystal violet is replaced by kresylecht violet; and a half minute usually suffices but it may be left on much longer.

*Recognition:* Diphtheria bacilli of the true type, suitably stained, are said to be distinguishable from all other organisms (Park), and are differentiated from pseudotypes by their length and form and the sharpness of staining of the granules. The body must be stained faintly, but seen distinctly and clearly from one end to the other through its entire length. By length alone one can often distinguish them from the common pseudo-bacillus of Hoffman which is usually shorter. In the entire series seventeen per cent were successful. This is not high but sufficiently so to make the test practicable and worth while.

In a small proportion of cases, a bacteriologic diagnosis of diphtheria can be made by direct smear as well as by culture. Contrary to the belief this is available to the clinician not possessed of unusual skill and affords a simple aid in the diagnosis.

ROY N. ANDREWS.

**THE ULCERATED MEATUS IN THE CIRCUMCISED CHILD:** Joseph Brennemann (Amer. Jour. Dis. of Child., Jan., 1921.). For a number of years the author's attention has been drawn with increasing frequency to a peculiar lesion of the meatus urinarius occurring only in circumcised male children, and characterized by ulceration, crusting, narrowing of the urinary passage, and nearly always accompanied by painful urination, distended bladder, and, occasionally, by hemorrhages. Routine examination of the urine gives no help. In twenty-five or more cases seen during the past winter and spring there has been no exception to the observation that this lesion is associated with what is known as the ammoniacal diaper. The lesions manifests itself as rather a superficial ulceration about the meatus. It is probably preceded, by a vesicle, though this is rarely seen before it is broken. At times the ulceration becomes deep and extensive, up to 2 mm. in depth and 5 mm. in width, usually it is more or less

covered by a crust which is very firmly attached over a considerable area. There is more or less inflammation.

The symptomatology is evident from the pathology. The salty urine coming in contact with the denuded meatus causes acute pain when the child begins to urinate. He immediately stops urinating and cries with pain. No amount of coaxing will induce him to try it again until the distended bladder becomes intolerable or begins to overflow. Then, having once emptied the bladder the same cycle repeats itself at the next urination.

The ammoniacal diaper that apparently always causes this condition of the meatus is still surrounded with mystery in spite of its common occurrence. The odor is not simply one detectable on close effort but the fumes are like those that escape from a bottle of ammonia. This condition is rarely noticeable except at night and most often toward the morning. Again, it may be absent for weeks or months only to appear again. The general condition of the child is usually good.

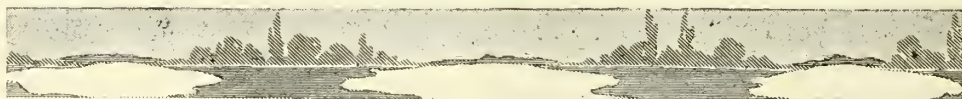
It is much more common in the latter half of the first year; probably attains its maximum frequency and severity during the second year; becomes less common during the third year, and vanishes soon after this.

The failure of the ammonuria to occur, except in connection with the wet diaper in situ, together with the peculiar behavior of the ammoniacal diaper would suggest a nondietetic factor residing in the diaper itself. On this basis Zahorsky, after failure to combat the condition by lessening the fat in the

food and by the use of alkalies therapeutically, came to the conclusion that the "immediate cause of the ammoniacal diaper is the presence of an alkali in the diaper, or the bedding." Again, the same author points out that the diaper or bedding which is infected by an enormous amount of bacteria is not boiled daily, and that this alone would play an important part in the ammoniacal diaper. The more inviting theory is based on the work of Keller and others that in certain nutritional disturbances due to the ingestion of cow's milk fat beyond the infant's tolerance there is produced a relative acidosis of enteric origin which manifests itself in the wine in the excretions of a hypernormal amount of ammonium salts.

Treatment: The treatment is naturally directed to the lesion itself and to the prophylaxis and treatment of the diaper. If the meatus is ulcerated or crusted over to some extent, and there is no obstruction, the proper therapy would seem to consist in applying thickly some substance like petrolatum that would coat over the involved area so that urination may be less painful and so that there will be protection on contact with the diaper. When the meatus is acutely inflamed and the opening narrowed, a wet boric acid dressing has always relieved the condition. This should be kept moist and well padded with cotton before the diaper is put on. The relief from this procedure has almost been instantaneous. Dispensing of the diaper at night prevents new lesions and allows the old ones to heal. The diaper should be thoroughly rinsed and boiled daily as well as the night clothes and bedding.

R. N. ANDREWS.



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# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### CLEFT PALATE AND HARELIP PROCEDURES\*

TRUMAN W. BROPHY, M. D., D. D. S.  
*Chicago, Ill.*

There are two objects to be attained in cleft palate operations: Normal anatomical relations, and correct function. The first step towards normal anatomy is to make use of the separated bones in such a way as to establish just as nearly as possible a normal palatal arch. Now, how can this be done. It certainly cannot be done by closing the lip over the greater congenital deformity and concealing it from view, leaving the patient deformed, to remain so to the end of life. A surgeon who would close the lip first and partially cover the deformity, does his patient though unconsciously no doubt an injustice, because the separated bones, no matter how much traction is made by the obicularis oris musele in moving them together, will remain separated to the end of life.

If the cleft of the palate is single and if the lip is closed, the long segment of bone will protrude far beyond the short segment and the edges of the alveolar processes will not meet, except in rare cases. In nearly all cases treated in this manner, there is an opening between the mouth and nose where no attempt at union has been made. To so operate is similar to closing a wound over a fracture and allowing the fracture to go without a splint. It is unnecessary to state that no surgeon would operate without adjusting the fragments and immobilizing them in the doing of this operation. Cleft palate surgery, when the palate is completely separated, is *always* bone surgery and the time must come when all will appreciate this fact and practice

this course of procedure in order to secure normality. If the surgeon succeeds in getting the lip closed over an extensively protruding premaxillary bone, still the deformity exists within the mouth, though covered up, and the patient will have a monkey-face so long as he lives.

When well understood, I regard the moving of the bones into proximity as one of the most satisfactory operations in surgery. Men who are not familiar with this work and who have not followed the hospital records, have claimed that the mortality is very high. Out of 577 patients under one year operated during the past five years, for the approximation of the maxillary bones and the carrying of the premaxillary bones into proper position, I have lost 16 patients. I attribute the low mortality of 2.77 per cent in these cases to the fact that shock is less severe following an operation at this age than it would be between 12 and 18 months, and further to the fact that I will not operate upon any patient unless it is in satisfactory condition. Patients of this age must be in the hospital under observation not less than 3 days, have a physical examination and must be gaining in weight.

A study of the thymus gland is of great importance. We know that status thymico-lymphaticus is a serious menace to surgical procedure in young children. I do not regard the surgical risk as great in infants under 5 months as between 6 months and 3 years. In December 1919 I lost a patient 18 months old, following an operation. The patient had been prepared as usual. It was large and vigorous. The child died suddenly. The autopsy revealed an enlarged thymus gland and status lymphaticus. As a precaution against such unfortunate events I have adopted as a routine measure the making of a radiograph of the child's chest so as to determine whether the thymus is of normal size. Percussion will fairly well outline the borders of the gland, but the x-ray is conclusive. If the gland is enlarged, operation should be deferred.

\*Read before the Southern Minnesota Medical Association, Mankato, November, 1920.

Often one treatment of x-ray will be sufficient to reduce the gland to normal size, after which the operation may be made, usually within 6 weeks.

Acidosis is responsible for many ailments. An examination of the urine should be, of course, included in the physical examination, but it is always well to anticipate acidosis and make use of sodium bicarbonate in small doses frequently given, for several days before operation. A dram may be dissolved in one-half pint of water and a teaspoonful given to young infants every two hours. We irrigate the mouth and spray the nose with a solution of boracic acid.

Formerly it was my custom to operate in the morning, the patient being allowed no food. More recently it has been my practice to give children a half ration breakfast at about 5:30 a. m., operating at 9:30. I believe that the food received at this time is of great advantage in giving the child strength and better fitting him for the anesthetic.

The anesthetic used is ether, although I prefer chloroform. But the general objection to chloroform and the difficulty in having it administered properly has led me to use ether exclusively. I would like to say in this connection that chloroform, properly administered, is, in my opinion, the best anesthetic known. Medical teaching in this country is, however, against it. In fact, our medical institutions do not teach its use and it would not be fair to a patient to have an anesthetic administered that is not understood. In my experience in France during the war, I never saw any other anesthetic than chloroform administered in the French and English hospitals.

In 1885, having become familiar with the methods employed generally by surgeons throughout the world and having studied the deformity from every point of view, I concluded that the time best suited to close a cleft palate was as early after birth as it was possible to operate. The basis of my belief was that a cleft might be closed by a little pressure immediately after birth, whereas six months later the bones would be so ossified that the moving of them together would be attended with difficulty and, besides, the results of the work would not be as satisfactory. A cleft palate is a fissure, a separation, nearly always, of well developed parts, not (with few exceptions) the result of *arrested*



Fig 1. The monkey-face. This child had protruding premaxillary bones. An effort was made to close the lip over them, with the result illustrated. The boy could not close the lip except with the greatest difficulty. His mouth was constantly open. The deformity following operation was nearly as great as the one which the surgeon undertook to correct.

*development, nor failure of the normal quantity of tissue to enter into its structure.* It is practically a wound. I hold, therefore, that *it should be closed in early infancy when it can be accomplished most easily.* Our text books and professors of surgery, with few exceptions, teach, if they teach it at all, that congenital harelip should be operated upon in early infancy and that no attempt should be made to close a cleft palate until the child is several years old. The practice and teachings of surgeons of highest repute have led medical men, in some instances, to advise those seeking information as to the most desirable time to operate for harelip and cleft palate, to have the lip operation performed at once and to postpone the palate operation until the child is from 3 to 10 years old. I have endeavored not only to overcome the objections raised to early operations, but also to avoid difficulties with which the older surgeons contended.



*After 35 years of study and clinical experience, I am satisfied that the most desirable time for operating upon cleft palate is within three months after birth. At that time we are able to secure more satisfactory results than in later life and we also avoid the objections usually raised by surgical writers.*

Within the past four years I have ventured to approximate the bones that were widely separated, with protruding premaxillary bones, in patients beyond infancy. A patient 5 years old who came to me, with extensively protruding



Fig. 2. Profile of same child, showing the extreme prominence of the lip, due to a misconception of the proper treatment of the protruding premaxillary bones. The surgeon did not realize that the protruding premaxillae called for bone surgery, which should always be the first step in correcting the deformity.

premaxillary bones and a complete cleft, was treated by moving the bones backward and approximating them, afterwards closing the lip. A child of 14 months who came into my practice about 2 years ago, had an extensive cleft of the palate in the median line. There was a complete separation of the premaxillary bones, leaving a central incisor tooth on each side of the fissure. The upper arch was so broad that the



Fig. 3. The protruding premaxillary bones in this child were moved back into their correct position by making an oblique incision through the vomer. The edges were freshened, as well as the edges of the maxillary bones. Two strong wires were carried through the maxillary bones, and anterior to the premaxillary bones, and anterior to the premaxillary bones beneath the maxillary periosteum. These bones were firmly immobilized. The soft parts over the freshened surfaces of the bones were sutured with horse hair. Fifteen months later, the imperfections of the lip were removed, the vermillion border corrected and the dilated nostrils were normal. From the ugly appearance that he presented in Fig. 1, we have in Fig. 3 a handsome boy.

teeth of the lower arch were completely telescoped by the upper, the lower teeth coming in contact with the mucosa covering the hard palate. This was indeed a problem. I resolved to approximate the bones. I carried 6 strong silver wire sutures through the maxillary bones, using 2 heavy lead plates (No. 13 American gauge), each perforated with 3 holes admitting 2 wires through each hole. These wires were brought together and twisted. As much force was used as I thought advisable, and I could see a slight moving of the bones under pressure. Ten days later, the patient was again anesthetized, the slack taken out of the wires and they were twisted again. So, by twisting the wires about every

10 days or 2 weeks, extending over a period of 3½ months, I was enabled to bring the bones into proximity.

I am now convinced that any patient up to 15 or 20 years may have these broadly separated bones approximated if the surgeon will take time enough, by moving them little by little and



Fig. 4. Here we have a profile showing the great improvement made in this lad by moving the bones into proper position and correcting the lip.

from time to time. We know that the orthodontist is able, by moving teeth slowly, to bring them into almost any position desired. The same is true of bone. In fact, bone having in it a large amount of cancellated tissue, is far more easily moved than teeth.

Nevertheless, in the light of surgical advancement and development of modern methods of procedure, *no cleft palate patient should be permitted to attain an age when speech is attempted without having an operation performed and the defect removed.* Students must no longer be taught methods which should be obsolete in this field of surgery; they must not permit the deformity to remain without attention; they must qualify themselves in modern methods in this special surgical work as they do in other depart-



Fig. 5. Extensive protrusion of premaxillary bones, double harelip and cleft of the palate.

ments of surgery. Having, then, in mind the anatomical defects of the palate, they should seek to overcome them, *bring the abnormal anatomical parts in normality and thus establish more perfect functional results.*

The second object of palatal surgery is correct function. We cannot secure function unless we secure a good palate—a palate long enough to pass backward to the postpharyngeal wall; the posterior palate must be safe, flexible and resilient. Such a palate cannot be secured when large lateral incisions with a view to relieving tension are made in its structure. The Langenback incisions should not be made. They are unnecessary. There are nine reasons why these incisions should not be made and not *one* good one why they should be made. With lead plates, wire tension sutures and horsehair coaptation sutures, a good palate may be made. When the palate fails to unite, it is due usually to a failure in the operation. If the palate is raised back as far as the styloid process of the temporal bone and hamular process of the sphenoid bone, it will be redundant. When denuded from the hard palate it will drop down and the edges meet



without tension. After adults and younger persons have been operated, they often think they should speak perfectly at once. It will be quite impossible, in the time at my command, to enter upon a description of the methods employed in training a patient, who has been operated after defective speech habits have been acquired, to speak well.

The study of eugenics is intensely interesting, and points unerringly to the inheritance of congenital defects. In a communication recently received from Dr. Chas. B. Davenport, Director of



Fig. 6. Interior of mouth, showing protrusion of bones, double harelip and cleft palate. A pulpless, loose tooth is visible. This was removed before the first operation.

the Eugenics Record Office, Cold Springs Harbor, Long Island, New York, he says:

"Of the 2,500,000 men examined (for army service), including 500,000 rejected, there were recorded 1183 cases of cleft palate and 283 of harelip." It would be impossible to enumerate all the states where statistics have been gathered. I give only a few.

| State         | Cases | per M |
|---------------|-------|-------|
| Vermont ..... | 13    | 1.55  |



Fig. 7. Premaxillary bones brought into correct position, the edges freshened in both premaxillary and maxillary bones, perfectly immobilized by wiring them in place.

|                    |    |      |
|--------------------|----|------|
| Maine .....        | 29 | 1.49 |
| North Dakota ..... | 18 | 1.01 |
| Illinois .....     | 68 | .38  |
| Arkansas .....     | 7  | .16  |

"The defect is commonest in agricultural sections of the north, 0.88 per M.; in negro sections, 0.35 per M.; in mountain sections, 0.59 per M., and in desert sections, 0.33 per M."

In considering these figures regarding the frequency of cleft palate, we must remember that those included were young men undergoing examination for the army, between the ages of 21 and 32. and we do not take into account the enormous group from early infancy to 21. It is only fair to estimate that a far greater number of cleft palates are under the age of 21 than over. Christopher Heath, the English surgeon, made the statement many years ago that nearly 50 per cent of cleft palate infants died of starvation since they could not perform the function of deglutition. This being the case, instead of there being 1183 cases of cleft palate in the



Fig. 8. Profile of boy after the premaxillary bones were united to the maxillary bones.



Fig. 9. Front view, showing, double harelip, and broadly flattened nose, the breadth being greater than the length.

United States, there would be many, many times that number.

It is well understood that complicated, tripartite cleft palate, with harelip, is the most conspicuous deformity known to mankind, and realizing the fact that this deformity is the least understood and the most unsatisfactorily treated in the whole field of surgery, we seek for a reason. There is one, which must be apparent to every observing surgeon. In 1915 I requested my publishers, P. Blakiston's Son & Company, to write to the leading medical colleges of the U. S. and ask the following questions: "Have you a Professor of Oral Surgery?" and "How many lecture hours per year and how many clinical hours in Oral Surgery are given?" Out of 64 replies, 6 were in the affirmative as to having a chair of oral surgery. This accounts for the apathy on the part of medical practitioners generally, in regard to this subject, since they have not, as medical students, had an opportunity to learn.

I was recently asked by a distinguished educator, not a physician, what I thought was most

needed in the department of medicine. I said to him, "Doctor, my answer is very plain. What the medical student most needs, in my opinion, is to learn how to take care of his patients." So long as only 6 out of 64 of our foremost medical colleges have in them chairs of oral surgery; so long as the interns, who are among the best men from our colleges, have no knowledge of the work we are here discussing, we can expect only such disastrous results as have been exhibited here today, in many cases, instead of having these deformities treated with the same knowledge, the same care and the same skill as we get in the treatment of other ailments and deformities of mankind. I do not wish to charge the young practitioner with negligence in this work because I know that if an opportunity had been placed before him and if he had been required to pursue these studies, he would at least recognize and follow a practice that would not leave the patients, as we sometimes see, in a worse condition than they were before they were operated.

Higher medical education—increasing the requirements for admission and for premedical



training, increasing the facilities for laboratory work, strengthening the faculties by bringing in men who have been thoroughly trained in their respective departments—has advanced most satisfactorily during the past decade, but the clinical facilities have not kept pace; post graduate work, while not up to the highest standard, has done much to aid the practitioner in the care of his patient. Why should oral surgery not be included?

It must be apparent to all that the greatest obstacle in the way of success in the field of oral surgery, and I might say oral pathology and surgery, lies in the fact that, as I have pointed out, there is failure on the part of medical colleges to teach thoroughly these important subjects. The many mistakes made in this field must cease;



Fig. 10. Nose lifted, after the lip was closed.

deformed humanity is entitled to better surgical results.

Dr. Chas. Mayo said in Chicago some years ago when addressing the Chicago Dental Society, "The next great move in preventive medicine will be accomplished by the dentists of our country. Will you do it?" To do it calls for a thorough training not only in dental histology, phys-



Fig. 11. Construction of palate, lip and nose completed. It will be seen that the nose in Fig. 9 is nearly twice as broad as in Fig. 11.

iology, anatomy and pathology, but they must do more than this. They must have a thorough training in general pathology and antiseptic surgery.

When the dental colleges of our country come up to this high standard suggested by Doctor Mayo; when the medical institutions demand as a part of the curriculum a training as thorough in oral pathology and surgery as they do in the departments of the eye, ear, nose, throat and cutaneous diseases, et cetera,—then, the innumerable errors now committed in the management of harelip and cleft palate will end.

#### DISCUSSION OF PAPERS BY DRs. BROPHY AND SHEARER

DR. GORDON B. NEW, Rochester: It seems almost superfluous to attempt to discuss a paper by Dr. Brophy on harelip and cleft palate work. I know of no man in this country who stands higher in the estimation of the profession in this class of work than Dr. Brophy.

I believe the principles he has outlined should be followed. However, in following them our method has been a little different, but I believe we have accomplished the same results.

We bring the lip together before the child is three



Fig. 12. View of cleft in central line, a central incisor tooth being on each side of the fissure.

months old. In doing this the alveolar process and the upper jaw are brought together, the results are identical with those shown in the pictures without the use of mechanical measures. If the child does not come to us until it is six or eight months old, some mechanical measure is necessary to bring the parts together. If the child is seen early enough, bringing the lip together will accomplish the same results. By comparing the plaster casts of the jaws before operation and the casts when the child comes back within a year for operation on the palate, the results are shown to be identical.

The operation on the palate should be performed before the child is fourteen months old; before the child begins to talk. We condemn lateral incisions; they cut off the blood supply which is the essential in cleft palate operations.

Another point of importance is to free the palate by cutting across the aponeurosis at the juncture of the hard palate with the soft palate.

With regard to the lateral incision: I make a small nick mesially to the alveolar process to allow the elevator to pass down to the bone and so facilitate elevation of the hard palate, which can be done much more readily in this way than by elevating it from the mesial margin.

DR. R. E. FARR, Minneapolis: I am sure we have all enjoyed the illustrated paper by Dr. Brophy. It was my good fortune to have had a chance to study



Fig. 13. Parts approximated, by the use of silver wire and lead plates.

with him and to have stood at his elbow for considerable periods of time, at intervals, and to go to his clinic and see, not infrequently, twenty-five of these cases with the nose in the center line, and later see those twenty-five cases come out with perfectly healed palates. It was astonishing to me to see him get primary union in so many of these cases I saw him operate upon.

At the Minnesota State Medical Association meeting this year we were told that cleft palate procedures had been standardized. At the same time the reader of the paper and the discussers of it stated that this standardization consists of closing the lip in early infancy and not in reposing the bones. Dr.

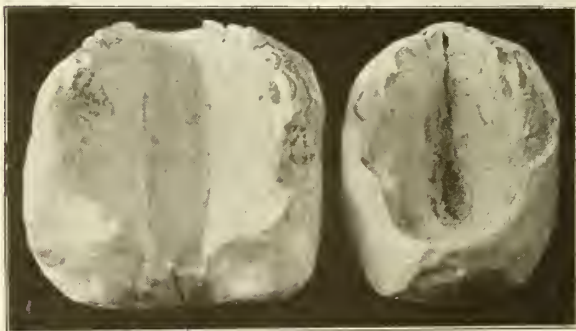


Fig. 14. Plaster cast showing (a) Complete separation of palate; (b) Anterior bones of palate united.



Brophy comes along and gives us another standard. Which one are we to accept and which one will live?

As has been stated here, the nose is always to one side—I refer to the cases with single cleft—and the middle of the face will bisect the ala of the affected side.

A number of years ago I had a number of young adults come to me who were operated upon in in-

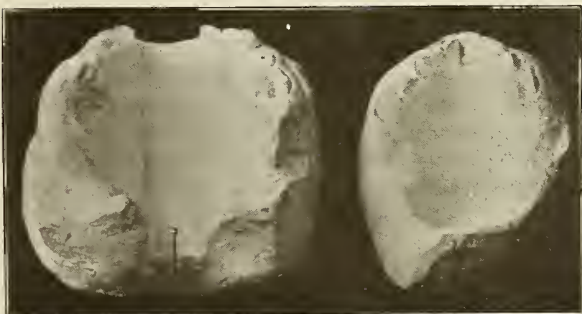


Fig. 15. (a) Plaster cast showing separation of palate (b) cast showing union of hard and soft palate.

fancy. I had four of these photographs, but misplaced them, showing the patient holding his finger between the alveolar processes in front. The space between these processes was from one-quarter to one-half inch wide. These lips had been closed in infancy, between the ages of eleven days and six weeks. They do not always come together and you cannot have bony union because you have mucous membrane intervening between the alveolar processes. (Here Dr. Farr showed slides of cases on which he had operated, and described the method of operating.)

DR. ALFRED T. RASMUSSEN, LaCrosse, Wisconsin: Much as I would like to be a listener only, I cannot refrain from getting to my feet to discuss this important subject. One or both of the essayists said that cleft palate and harelip is the most conspicuous of all deformities to which the human race is heir. It is more than this. It is undoubtedly the most hideous congenital deformity we have to deal with. A man may be minus an arm or a leg; he may be deformed in almost any other way, and yet he can associate with other people. But the poor unfortunate who has a cleft palate and harelip is

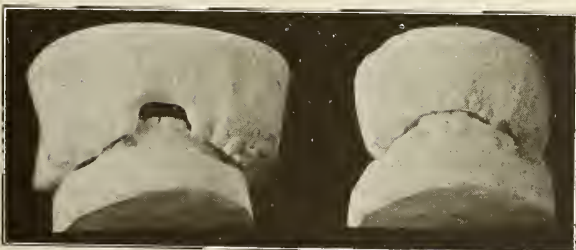


Fig. 16. (a) Manner of occlusion of upper with lower jaw, prior to operation; (b) upper and lower teeth occluding properly after operation.



Fig. 17. Photograph of child before operation.

ostracized and avoided by all because of the mental depression which the sight of it causes.

I was very glad indeed that both essayists called attention to the fact that surgery of the palate is bone surgery *per se*. That I believe should be so drilled into the minds of surgeons that when they think of a cleft palate operation they think of bone surgery. In all bone surgery it is absolutely essential that the various steps be taken in their proper sequence. What surgeon, if he had a wound to treat, in which there were misplaced segments of bone, would close the wound, with no thought of placing such bones in their proper relation? Place these bones, viz. the bones of the arch, where nature intended them to be, and when you have them there, with the cancellous bone in apposition, immobilize the parts and hold them there until nature has affected a bony union. You expect to get this result in other bones; you may expect to get it in the bones of the palate. We do get it. Later, when we have a normal bony arch the subsequent operations for the closure of the lip, soft palate and correction of the nose may be done in their proper order.

I want to mention one point which I was in hopes one of the essayists would mention in connection with the mistake we have seen so often of closing the lip first. The sole object of the lip operation is to make a lip as nature intended it to be for that individual. That cannot be done unless there is a normal arch. Let me repeat, it is a surgical



Fig. 18. Photograph of child after operation.

impossibility to construct a normal lip over an abnormal arch. I hope that is clear. When an attempt is made to close the lip over the divided bones as we find them, in any of the various types of cleft, the best that can possibly result is a tense band of soft tissue, more or less cicatricial in nature, stretched across the anterior portion of the separated bones. We have seen the results of this mistake so often. In many cases an attempt is later made, with more or less success, to reconstruct these lips. This is always a very difficult task at the best, due to having a great mass of scar tissue in place of the normal structure of the lip.

Let me say further, and I trust I may be pardoned for saying this, that just as long as surgeons persist in closing the lip first, just so long there will be work for the specialist, later on in the life of the patient, to do what he can towards forming a lip out of this dense mass of scar tissue. I feel very keenly upon this for the patient's appearance throughout his whole life depends upon the lip operation being so done that the lip will be normal.

Another thing: let no surgeon delude himself by taking a large dose of soothing syrup in the form of "Closing the lip first". We know the tremendous deformity we have in these cases. The bony parts are not in proper relation. Closing the lip over such malposed bones will not bring them into proper position. True, the relation of the bony structures may in time be somewhat changed but there will

never be union of the parts. In some parts the deformity is usually increased, notably the tuberosities. They are often wider apart than before. This makes much more difficult the closure of the posterior part of the palate. Such procedure is like closing the door to the skeleton closet; the skeleton still remains. So does the deformity.

I want to say just a word or two about the soft palate. Function is most important. No soft palate will function properly unless it is normal. What is a normal soft palate? It is a soft, flexible, resilient palate of the proper size and shape, in which the anatomical structures have not been disturbed. This cannot be if lateral incisions have been made in the soft palate. If the tensor palati or any of the palatine muscles are divided, the function of the palate is lost due to the lack of muscular action. Such incisions when made become closed by cicatricial tissue which in turn contracts, thereby producing a hard, tense, "Drumhead" palate, which cannot function. No surgeon wants to produce such results. Furthermore, when once such a condition is established, we know of no way of reestablishing normality. Therefore I say, with all the emphasis at my command, *never make any lateral incisions in the soft palate.*

DR. BROPHY (closing the discussion): I have been treated so kindly ever since I came to Mankato, especially this afternoon, that I do not feel like consuming any more time of the Association. If I have said anything this afternoon which will set men to thinking who have not heretofore given this subject a great deal of thought, I shall feel amply repaid. If I have said anything that will lead surgeons and physicians to see to it that young children are supplied with the proper facilities to take nourishment from the means I have suggested, which are not theoretical, I know it will prove of great value. I am satisfied that the lives of these children can be saved if they can be nourished during the first three or four months of life. The fact of the matter is that these little ones come to us weighing in a month or so less than when they were born. They come to us suffering from gastroenteritis because they have not received the proper food, and what they did have they have not been able to take and dispose of properly, and they come to us as sick children. We try to do our best for them, in order to bring them into a state of health. Now and then, one dies before we can operate, because we cannot bring them up to a normal condition, but this is largely due to the fact that they have not been properly nourished. These children should be operated on as early as they can be, or as soon as they can be put in good health. Then the most important thing of all is to remember that we do not want to leave the patient with a crooked nose. We do not want to have the patient with an irregularly shaped jaw. It is very essential for us to put the bones where they belong and hold them until union takes place. You cannot call this reconstructive surgery. It is coconstructive



surgery. We cannot reconstruct a thing that has never existed. We construct a palate out of what we find, pull it together, and unite it with great satisfaction after the manner described by Dr. Shearer.

Again, I wish to express my thanks to the offices of the society for the courtesies and kindnesses that have been extended to me.

### CLEFT PALATE AND HARELIP\*

WILLIAM LETE SHEARER, B. S., M. D., D. D. S.  
*Omaha, Neb.*

Congenital cleft palate accompanied with cleft of the lip, either single or double, is unquestionably one of the most conspicuous deformities known to the medical world. It is a most distressing calamity to the parents, and, when not successfully corrected, it is a source of grief, not only to them, but also to the child all through life; so much so to the child, that he will shun society. As a result, his ability to earn a livelihood later in life is greatly lessened, and he becomes more or less a burden to friends and society.

Much as has been written upon this subject it is very evident from the great number of surgical and functional failures that much more must be written and greater study given by those who would undertake this class of surgery.

Men cannot be masters of this work with an ordinary training. It is a matter of many years of the most concentrated study if they expect to give the unfortunate one that to which he is entitled.

Cleft palate is the result of failure of union during development in embryo, of the parts which make up the palate. At the time of birth, a cleft palate child possesses the normal amount of tissue (with rare exceptions), to form a perfect palate, although it is not united; statements to the contrary notwithstanding.

It is true, however, that later in life, due to insufficient use of the musculature of the palate, more or less atrophy results. It is likewise true that any other part of the body when not used does not develop.

This one truth alone should be sufficient to commend early surgical intervention upon the bones as well as comparatively early surgical



Case 1. Plate 1. Boy five years old. Showing cleft of bones. A cleft of this character should be operated at the age of from three to six weeks. Attempts had been made to close this palate before I was consulted. In cases of this character it is either necessary to employ a Greenstick fracture technic or long slow movement of the jaws into position.

treatment of the soft palate as advised by Brophy.

#### EMBRYOLOGY AND HISTOLOGY

In the formation of the palate there are six centers of ossification, two palatal, two maxillary, and two pre-maxillary; and associated with the bone centers are the soft tissues, mucous membrane, connective tissue, periosteum, et cetera, which go together to form a normal palate. Only when an interference of some character occurs, do we have cleft palate result, often associated with cleft of the lip.

During embryological processes all babes have cleft palate prior to the second month of gestation. Near the end of the eighth or ninth week of the embryo, the palatal processes should be perfectly united.

#### PREDISPOSING CAUSES

There has been much written relative to the etiology of the cleft palate; yet, most may be, and doubtless is, conjectural. This deformity, like

\*Read before the Southern Minnesota State Medical Association, Mankato, November, 1920.

all other teratological phenomena, is subject to further investigation. Different authors have attributed as causes, prenatal impressions, uterine inflammation, venereal diseases, pressure, defective nutrition during early weeks of gestation, heredity, and intervening mucosa in tooth enamel formation. The one standing out most convincingly is heredity. Prenatal impressions have been suggested by some writers as an etiological factor. They may be a factor causing failure of union. However, there has been no evidence of value given \* \* \* No doubt faulty metabolism may play an important role in certain few instances. However, it is my belief that the child may be generally a weakling and yet be normal as to formation of parts. It has been stated by Professor Warnekros that super-

epithelial cord at the distal end of which the enamel organ is formed, thus forming an obstruction.

Brophy says, "It seems that Boedecker's con-



Case 1. Plate 2. Shows condition after employment of Greenstick fracture to close cleft, and the bringing of the nose into the median line of the face.

numerary teeth are always the cause. The late Doctor C. F. W. Boedecker, attributes the cause to intervening mucosa in tooth formation. The mucosa, during formation of the teeth, dips deep down into the submucous tissue and forms the epithelial lamina, this later contracts into the



Case 1. Plate 3. Shows child after correction of the lip.

elusion that this epithelial cord delays union of the parts forming the maxillae, and the force exerted by the tongue and mandible from the beginning of the third month until birth and several months later, would account for the broad separation of the maxillary bones and the creation of the cleft."

Uterine inflammation and venereal disease no doubt are the cause of many physical defects. Inflammation may affect the development as it does many other parts of the body.

Doctor Charles Mayo believes and has said, "There is a great principle involved in the causation of birth deformities, and it is one which should explain various types of deformities. As one observes birth defects or anomalies, it is apparent that many of them are normal conditions in some lower type of life, e. g., harelip, cleft palate, fissure defects, etc. Anomalies in circulation, multiple ureters, location of organs,





Case 2. Plate 1. Case similar to Case 1, Plate 1, only more advanced in years. Boy aged 11 years.

and defects due to changes in the evolution of the invertebrate to the vertebrate, which largely affect the nervous system, acephalus, hydrocephalus, spina bifida, club foot and post-anal dermoids.

Experimentally, changes in the salts in which the eggs of several of the lower forms of life are developed, lead to a certain percentage of anomalies. This is undoubtedly the reason why a high type of fish like the salmon, probably in an evolutionary state, leaves salt water to lay eggs in fresh water. Anomalies in the human embryo occur in variation of fluid, especially excessive quantity of hydramnion. It is most probable that the cause of embryonic deformities is due to changes in the salts of the amniotic fluid in which the egg is developed, just as it has been proved to be in the lower types of life."

Observations made by Doctor O. A. Strauss in the study of abnormalities of animals in the zoological gardens at Berlin, October 1913 are particularly interesting. Thirty-two jaguars born of one mother by the same sire, within one year, had cleft palate and all died. The parent animals were fed cold meat from which the blood

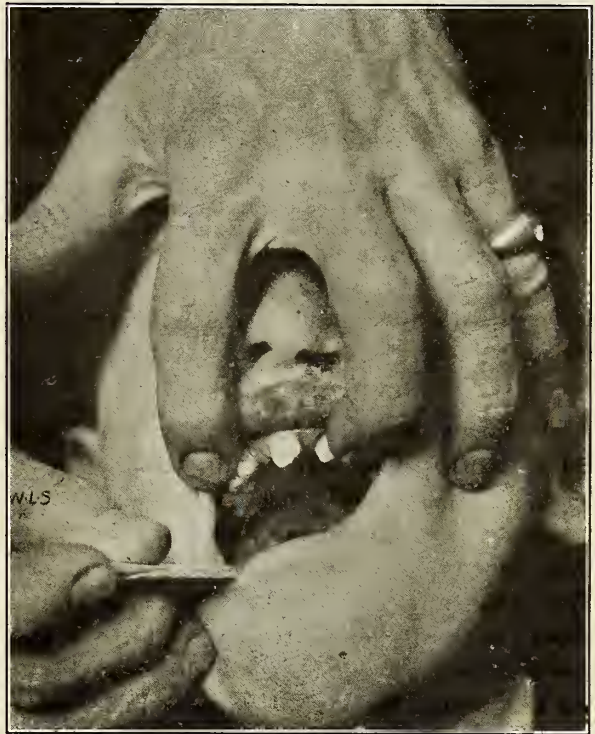
had been allowed to escape. Later the diet was changed and they were fed meat which was still warm, and which contained blood, and upon this diet not a single cleft palate occurred out of two litters in one year (about twenty-five jaguars).\*

\* \* Brophy's Surgery—Pages 579-80.

On the other hand, Mall's investigation on the collection of monsters at John Hopkins is at least suggestive that the primary factor is located in the embryo.

It has been my experience when possible to obtain a good history of a family that almost always a record of cleft palate was noted. On the other hand, parents are reluctant to give their true history, so it is often difficult to trace heredity.

As a general thing, nature does not fail to pro-



Case 2. Plate 2. Shows cleft of the hard and soft palate closed.

vide sufficient tissue to form a normal child with a normal palate, but often fails to bring the parts in apposition so union will result. We are consequently dealing with a true arrest of development. We are therefore inclined to conclude that whether from inflammation of the female pelvic adnexa, or from a more subtle cause, the early nutrition of the embryo is in-



Case 2. Plate 3. Nose in middle of face and lip corrected. Case of this character should be taken care of early as described in paper, thus avoiding the necessity of heroic measures.

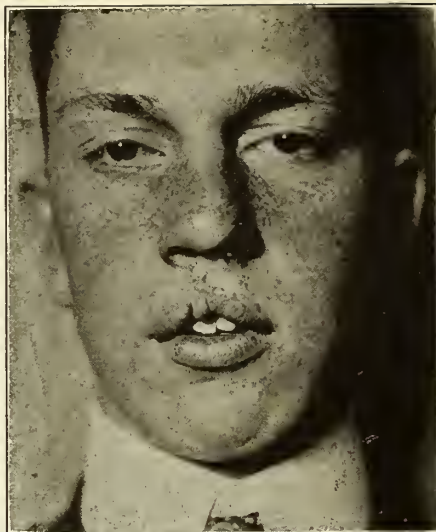
terfered with, thus producing a dis-harmony of the growth energies.

#### EXCITING CAUSES

The tongue is thicker between the second and third months of intrauterine life than it is at birth, and consequently, takes up more space between the developing bony plates of the palate, thus interfering with their meeting and union. The muscles of mastication becoming active about the third month, bring pressure from the mandible on the flexible bones of the palate, serving as a wedge, forcing the halves apart, resulting in a much wider breach.

Normally, the upper jaw, from tuberosity to tuberosity, is smaller than the lower. If careful observations are made of a child with complete cleft of the hard and soft palate, it will be found that the upper jaw overlaps the lower. This makes it easy to see how the mandible may spread the two halves of the upper arch.

The normal position of the fetus in utero, is such that a great part of the body weight may be thrown upon the vertex, and the pressure exerted tend to force the mandible into contact



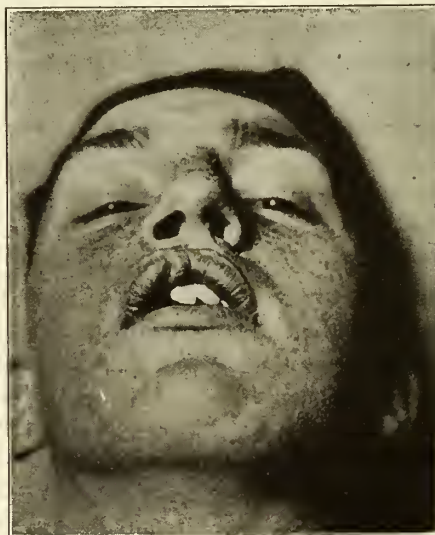
Case 3. Plate 1. Condition of lip after operation in early infancy.

with the sternal region and compress it against the forming hard palate. The head being in a flexed position, with the symphysis of the mandible resting on the sternum, may add to the force exerted by the mandible.

#### PHYSIOLOGY

Deglutition is most difficult for a child with cleft palate, and, as a result, many are poorly nourished. The milk taken, in the act of swallowing, regurgitates through the nose.

Both the palate and the tongue are important organs of speech, but the former is the more so; for, not only is it essential in the enunciation of nearly all the elements of speech, but owing to



Case 3. Plate 2. Note wide spread of the nostril.



its direct attachment to the larynx, it is also an important factor in the production of the voice. It is in the articulation of consonant sounds that the palate is especially essential.

#### SPEECH HABITS

It must be remembered that the acquirement of speech habits begins early in the second year and continues during the period of childhood. It is during this time that nature provides for the normal development of speech. Children appear to inherit a tendency toward speech devel-



Case 3. Plate 3. Note change of nostril. Roll of the vermillion border of the lip established.

opment and cases have been reported in which whole sentences have been uttered spontaneously without any preliminary practice. The more serious forms of defects of speech are those that are acquired during this formative period. It is then that faulty impressions of the elements of speech are stored in the auditory centers of the brain and faulty habits formed in the use of the various mechanisms of speech.

Time does not permit me to here cover the full physiological function of the palate, yet in defense of the early operations a few facts must be considered.

Inasmuch as surgical measures for the closure of the cleft palate are undertaken largely for the purpose of improving speech, they should be employed as early as possible before the formative speech period.

Habits of speech formed early cannot be changed without special instruction. To make a normal palate take the place of a cleft palate,



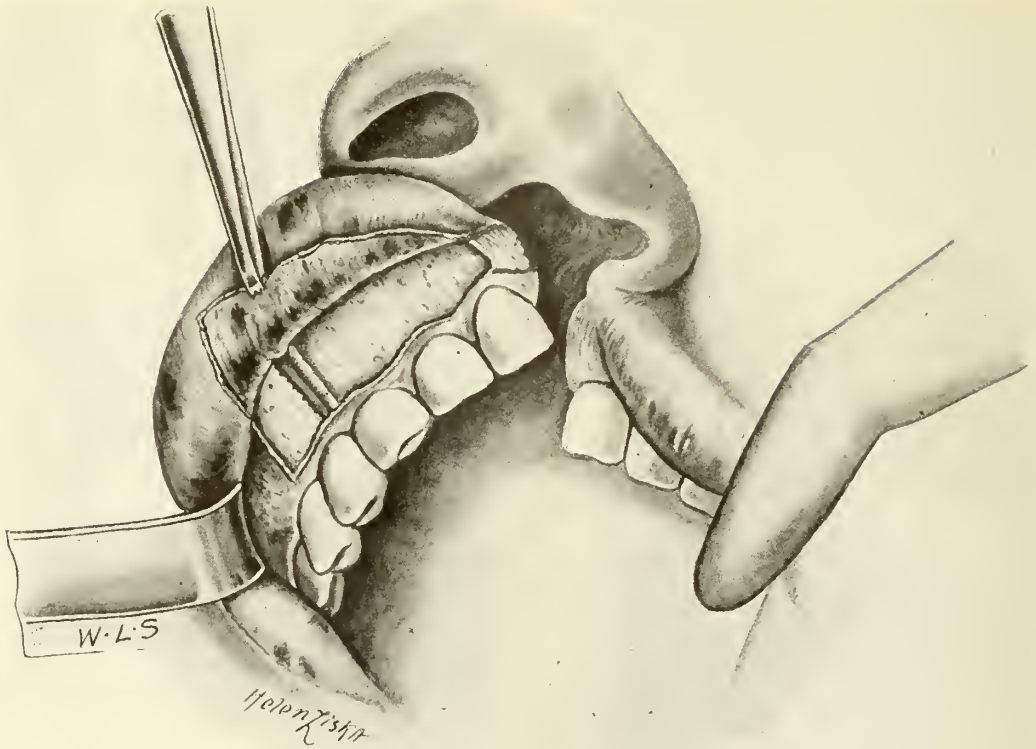
Case 3. Plate 4. Correction of lip. Change of shape of nose.

the soft parts must be so manipulated as to avoid the formation of scar tissue. If incisions are made through the soft parts and measures are omitted to lengthen the palate, masses of cicatricial tissue will form with contractions.

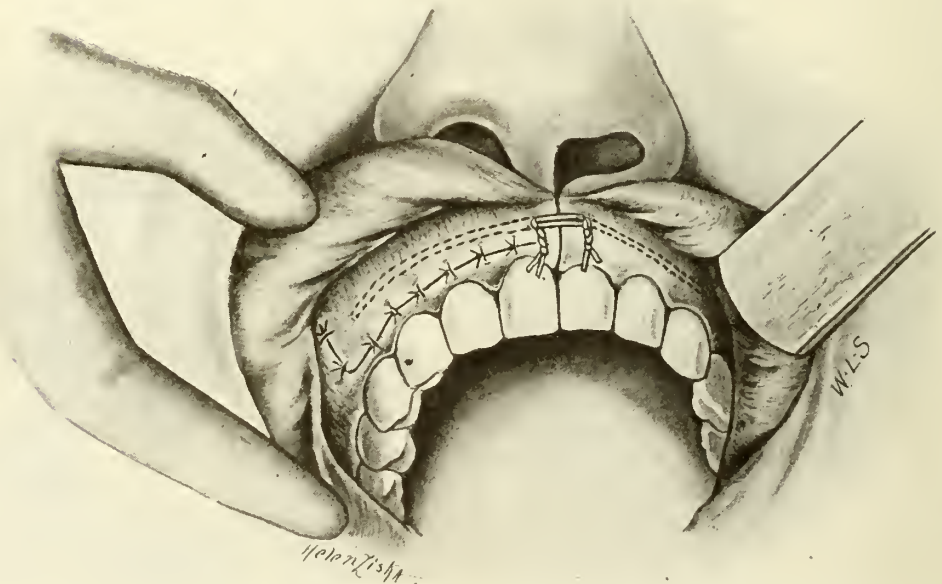
When a cleft of the palate is improperly operated the patient's faulty speech affects him both mentally and physically. It has been said that a faulty habit of speech must be supplanted by a correct one, but it becomes more than a habit with these cases. It is a deeply rooted neuro-muscular disturbance or perversion that has arisen from an effort on the part of nature to accommodate it-



Case 3. Plate 5. After one year. Note change in expression.



Case 4. Plate 1. Diagrammatic of modification of Brophy greenstick fracture operation.



Case 4. Plate 2. Illustrates wires in the mucoperiosteum, flaps brought back and sutured with horse hair.





Case 5. Plate 1. Very extensive single cleft of the hard and soft palate.



Case 5. Plate 3. View inside the mouth, showing the bones placed in proper position.

self to developmental structural irregularities in certain important parts of these mechanisms. It is somewhat analogous to the effort on the part of the neuro-muscular mechanisms of the heart to accommodate themselves to a faulty valve, but it is far more complicated because of the volitional and other physical faculties employed in the development of speech.

Dr. Brophy has designed a nipple which enables the babe to take its food with little difficulty and it is surprising how quickly it recognizes this and will poke its nose around in search for the nipple before beginning to nurse from

the mother. He has also designed another nipple for the bottle babe, made on the same principle.

#### FORMS OF CLEFT PALATE

The different forms of cleft palate will not be presented in this paper, other than to state that there are, in number, fifteen, and that the form decidedly governs the time of operation, et cetera.

#### PREOPERATIVE TREATMENT

I have been convinced many times that the value of feeding an infant preparatory to surgical intervention has been sadly overlooked. *Failure to secure proper nourishment is a valid*



Case 5. Plate 2. External appearance after the closure of the bones only.



Case 5. Plate 4. Case completed. Slight correction of the vermillion border was made later.



Case 6. Plate 1. Before surgical intervention.

*reason for early operation.* The general condition of the babe should be considered carefully. Too often these children are brought to the hospital and subjected to operation at once. In a couple of days a cold develops which may have been contracted on its way there, and its effects, added to those of the anesthetic and operation, may result in pneumonia and death. Accordingly, it is my judgment that the services of a pediatrician should always be employed.

#### OPERATIVE TREATMENT

It must be ever borne in mind that the palate is one of the most important organs of speech and being directly attached to the larynx, makes it a



Case 6. Plate 3. Case completed.

most valuable factor in voice production. The articulation of consonant sounds is very difficult for cleft palate children. I recall one young lady, twenty-seven years of age, for whom I operated an extensive cleft palate, who had much difficulty in learning to talk. I kept in correspondence with her for two years, directing her in learning to speak over again. Great patience should be manifested for those so afflicted as they have more trouble than we are able to appreciate, and are most always too timid to seek our cooperation. We must remember that the closure of the palate is not the only thing sought



Case 6. Plate 2. After bone surgery only.



Case 7. Plate 1. Unhappy result after operation in childhood. Note the broad, flat nostrils.





Case 7. Plate 2. Nostrils narrowed fully one-half inch. Lip corrected.



Case 8. Plate 2. After lip correction. Twin died few months after returning home.

for. The most important by far, is presenting to the patient a flexible, resilient, palate which is so much needed in speech.

A babe with complete cleft palate and either single or double harelip should be treated in three steps as follows:

1. Bone surgery, if possible, within the first month to six weeks.
2. Lip and nostril, six weeks after the bone operation, or earlier, if the bone operation has been a success and the splints removed.

3. Soft palate, preferably about the fourteenth to sixteenth month.

The bone surgery should be done early before ossification has advanced, the bones being more easily moved to the position desired and the shock being much less to the patient.

When there is a double cleft with premaxillary protrusion, *this premaxillary bone must never be excised*. A deformity follows which is far greater and more difficult to repair than that originally presented. It is in fact, a calamity that cannot be repaired. With the excision of the premaxillary bones go the tooth germs and



Case 8. Plate 1. Twin girls. Each twin possessed complete cleft of the soft palate and single harelip. The anterior ridge of the hard palate was not involved in either case.



Case 9. Plate 1. Double harelip.



Case 9. Plate 2. After operation.

the child is forever missing temporary as well as permanent teeth. *They must be put back into position to form a normal arch.*

Operations performed in early infancy afford the best results, despite the fact that very successful operations may be made at almost any time in life.

It cannot be too frequently repeated that the first undertaking should be the closure of the



Case 9. Plate 3. At age of eleven years.



Case 10. Plate 1. Side view of a very extensive double cleft of the hard and soft palate with premaxillary protrusion.

cleft of the bones, because herein lies the success of the subsequent operations. With proper technique following, the normal physiological functions of the palate are restored.

The many complications encountered in this field try the ingenuity and patience of the surgeon to the very utmost.

Certain definite steps must be carried out to give the child a flexible resilient palate. A specially designed periosteal elevator should be used to perfectly separate the soft tissues from its periosteal attachment. Great care is necessary in the very initial step of passing through



Case 10. Plate 2. Front view of the same case.





Case 10. Plate 3. First operation. Placing the premaxillary bones into position to form a normal arch.



Case 10. Plate 4. After correction of lip.



Case 11. Plate 1. Cleft of the soft and part of the hard palate in woman aged forty-four years.



Case 11. Plate 2. After closure of the complete cleft in one operation, without the employment of lateral incisions.

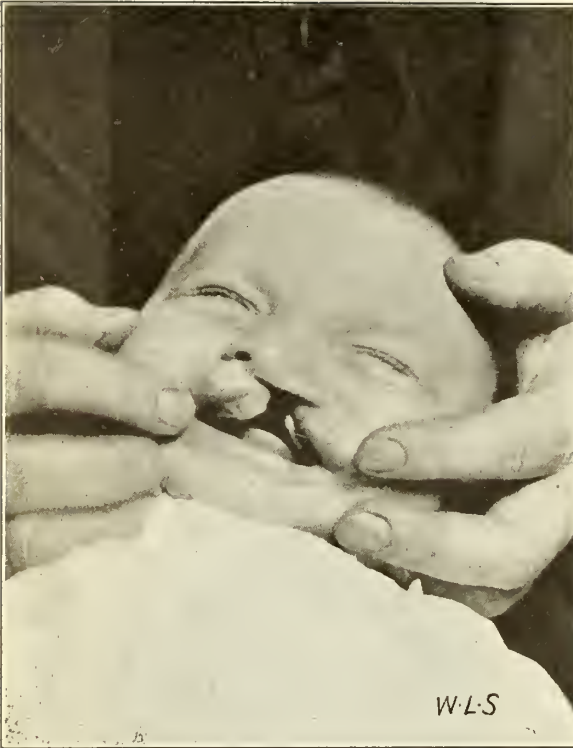


Case 11. Plate 3. Photograph of patient.



Case 12. Plate 1. Nipple designed by Brophy to aid child when nursing from the breast.

Case 13. Plate 1. Nipple designed by Propy to aid child when nursing from the bottle.



Case 14. Plate 1. Cleft of the anterior ridge of the hard palate involving the soft palate, lip and nostril.



Case 14. Plate 2. After bone operation only. Note how the two halves of the lip fall into position when bones are properly placed.



Case 14. Plate 3. After lip and nostril have been repaired. Note position of the nose in the median line of the face.

the muscular mucosa, down to the periosteum in the process of lifting the soft tissue.

The periosteum should be freed along the posterior border of the horizontal plates of the palate bones, extending down and back of the hamular process on either side. Very rarely is this accomplished in cleft palate surgery.

When the horsehair coaptation sutures are placed, no tension can be allowed, or sloughing will follow, and the operation result in failure. It is necessary, at this time, to place tension sutures of silver wires supported by lead plates, to prevent tension on the horsehair sutures, as described above.

#### POST-OPERATIVE CARE

In this operation, post-operative care is most essential. Isolation of bacteria being impossible, it is necessary to irrigate the parts after each feeding, and in some cases, a half dozen times a day. When it is impossible to isolate an organism, it must be combatted by other means, and in this instance, constant irrigation is considered one of the laws of success.

In the last two operations, namely, that on the lip and that on the soft palate, great care should



be exercised not to traumatize the tissue more than is necessary, as sloughing, particularly in the soft palate is apt to follow.

Lateral incisions in the soft palate should never be made (they are unnecessary) because in so doing the tensor palati muscle and nerve are very likely to be severed, and once severed do not reunite. Following in the wake of this unfortunate procedure is deafness, owing to the fact that by traction in the act of swallowing and speaking, the tensor palati muscle dilates the pharyngeal orifice of the eustachian tube.

Permanent sutures left in the mouth at the completion of any of these operations should be silver wire, lead plates and horsehair, for the reason that they do not absorb the saliva which is constantly contaminated with different forms of bacterial life.

Older cases are not complete until speech training has been initiated.

*Discussion appears on page 289.*

#### AN ATTEMPT TO UNIFY AND HARMONIZE POINTS OF VIEW OF MEDICAL AND DENTAL PROFESSIONS TOWARD THE CONSTITUTIONAL INFLUENCE OF DENTAL PATHOLOGY\*

W. E. MENTZER, D. D. S. and

E. L. TUOHY, B. A. M. D.

*Duluth, Minn.*

The title of this paper and collaboration of a dentist and a doctor will draw to your attention our desire to point the need of a more rational cooperation between the two professions than is presently obtaining. The report aims to be a presentation of the viewpoints of both professions, not as distinct entities but as a common judgment. Since the subject of arthritis has received the largest amount of attention from the standpoint of focal mouth infection, we are fortunate in being able to present the data on 397 cases studied in the army from the dental point of view by Dr. Mentzer under the service of Dr. Ralph Pemberton and others. His work on gum prophylactic treatment of diabetics under F. M. Allen will be referred to. In addition, I (Tuohy) have gone over all the records

of the Duluth Clinic for the past three years, of cases diagnosed as arthritis. The data on these will also be presented. We will purposely give attention primarily to the teeth and gums. This is because tooth extraction to dissipate constitutional disturbances based on a supposed alveolar infection has gone so far as to be almost alarming. Reference will be made to the question of tonsil infection chiefly as a matter of comparison.

#### THEORETICAL CONSIDERATIONS OF FOCAL INFECTION.

Billings, Rosenow and their followers may well be congratulated on the rapidity with which their early teachings have secured popular approval. Approval based on clinical results has, as a whole, been more evident than experimental confirmation by other observers. It is not our intention in this paper to discuss the question of transmutability of strains of streptococci or the question of regional or tissue selectivity for certain orders of streptococci or their toxins—normal or abnormal denizens of the mouth. This feature has received so much attention that no reference to any human disorder has seemed complete or judicious without a reference to the probable effect of alveolar infection and the need of its eradication. It recalls the trail of many previous medical hegiras into the field of speculation, searching for a ready panacea for human ills. Nevertheless, we wish it to be distinctly understood that we think the focal infection principle gave to the profession a very positive weapon for human defense; it is encumbent upon us to learn how and where to apply it within safe limits. A growing number of individual experiences are at hand in the work of every busy clinician, clearly establishing a reasonable basis for such a search for alveolar pathology with resultant improvement after its eradication. In fact, it is the result of our enthusiastic approval of the principle of focal infection that has induced us as physicians to go too far in encouraging tooth extraction. The fear of tooth infection following operative dentistry, as well as the unexampled claims made for benefit from wholesale extraction of teeth, has stifled the enthusiasm of conscientious dentists for conservative dental reconstruction; or, it has driven them pell-mell into the schools for exodontists.

No other surgical focus of infection has re-

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

ceived even a small fraction of the attention given to the teeth, with the possible exception of the tonsil. A comparison of these two foci is particularly instructive: A tonsillectomy properly done results in little physiological change or rarely much discomfort to the patient, barring a possible dry throat. This statement relative to the fruitless removal of the teeth certainly cannot be made. Bodily nutrition stands out as one of the most fundamental problems of life. Many of the lower animals are helpless without their teeth. It has been stated repeatedly that the teeth are transitory organs developed from highly specialized ectoderm; that under ordinary tendencies they show early evidence of deterioration. Prior to this crusade along the line of alveolar infection, American dentists had acquired a world wide fame for conservatism and skill in tooth reconstruction and in the maintenance of a proper chewing surface. We will all grant that they undoubtedly went too far and retained many teeth by pegs, bridges or other means that should have been extracted. They were also, no doubt, careless as to asepsis. Nevertheless, it has been proven that entirely safe and reasonable dental work can be done at a time when teeth can be saved. Therefore, the dental profession needs our aid in teaching people who present themselves sufficiently early the proper conservation of their teeth and gums. Teeth are not only ornamental but extremely useful, and no set of false teeth, however skillfully made or fitted, can replace a reasonably serviceable and intact original group. Especial emphasis is given this because it is not the dentist who has shown the greatest desire to remove the teeth. Great impetus has been given this tendency by the lazy attitude on the part of the clinician, who sees a shortcut to results rather than the time honored search through the arduous methods of differential diagnosis, for a logical treatment.

#### A REFERENCE TO THE DENTAL LITERATURE

Doctors do not read the dental journals enough; they should become more familiar with the valuable research being conducted by the dentists themselves. They should become acquainted with such names as Talbot, Schuhmann, Federspiel, Hartzell, Price and others. Percy R. Howe, of Boston, Mass., in recent numbers of the *National Dental Association's Journal*, has ideas on focal infection that every doctor

should read, whether he agrees with him or not. Rosenow intimates that Howe's experience has been too largely attained in a dental infirmary for children. His point is well taken, but Howe's criticism of animal experimentations in general, is in keeping with the findings of Rufus of New York, that egg albumin injected into the ear vein of a rabbit produced much the same result as when the various strains of streptococci were used.

Howe takes particular exception to the method of injecting very large masses of culture material into this most susceptible laboratory animal, and thereafter quoting the resultant gross changes in certain organs as being suggestive of what happens to a patient who happens to show a few apical granulomata.

#### THE SHIFTING SANDS UPON WHICH OUR PRESENT KNOWLEDGE OF IMMUNITY IS BASED

It would seem judicious, in view of the numerous mooted questions involved in our protection against disease, to speak of immunity very guardedly and weave it into any argument with due reference to its numerous confusions. This is not done by most of the strong proponents of focal infection. Our immunity to acute and chronic infections must be a very subtle question of balance between the bacterial invader and the host. Probably, as Price has vividly portrayed, while life exists there is this battle waging back and forth, with varying success, either to host or invader. A certain turning of the tide in the favor of the host may be brought about by clearing up mouth infection and instituting proper hygiene; but, to reason that if improvement does occur the true etiologic factor has been uncovered, is a therapeutic fallacy needing no refutation. Our population includes a very large percentage of substandard individuals,—those with an emotional capacity far out of proportion to their physical reserve. It is in this class that the enthusiast can most skillfully exercise the imagination.

He does not pause at the demonstrable effect that may be produced on joint surfaces or valve leaflets by streptococci or their toxins, said to attain the circulation from a circumscribed apical abscess, but feelingly refers to those influences producing violent functional changes through that elusive phantom the endocrine balance or vasomotor control. The problem is not



as simple or direct as we might wish: the pediatricist has noted that in the presence of an acute tonsillitis, children are particularly susceptible to pyelitis. The invading organism in the tonsil is usually the streptococcus; when the pyelitis develops it is usually of the colon bacillus type. Removal of the infected tonsils appears clinically to have turned the tide in favor of the child and hastened a remission in the pyelitis. Ivy's experiments on the artificial production of gastric ulcer is illuminating; direct trauma or even direct bacterial injections into the wall of the stomach did not produce ulcer in healthy dogs; a distempered dog, however, readily developed experimental ulcer.

The balance of strength between invader and host has another tragic significance; the unwise removal of too many diseased teeth, or too much gum manipulation, has overwhelmed an already grievously afflicted individual too often to be considered a matter of coincidence. This we have seen in instances where we felt the mouth condition was entirely secondary to a systemic state or possibly the primary source. A man, a very severe drinker, with a foul mouth, got on fairly well after some preliminary cleaning up of pyorrhea alveolaris and the extraction of a few roots. His impatience led his dentist to more elaborate extraction, and a hematogenously implanted pleuropneumonia ensued, with an ultimate lung abscess and prolonged and horrible death. Less vivid, but equally direct, is the experience of numerous pernicious anemias, diabetics, and that wandering flood of chronic arthritides, who, grasping eagerly at any straw, arise toothless but hopeful. The natural remissions of the disease are credited as good results following tooth removal. Cause and effect are being constantly interchanged. Time, and a close tabulation of cases, will of course tell us the truth, but in the meantime we must hasten, before the adult population becomes toothless. Laboratory research alone will not settle the question. The practical doctor and dentist must work hand in hand, and both use their very best judgment. It is not sportsmanlike to leave the matter of tooth extraction to the judgment of the patient with a chronic disease; his judgment is neither good nor scientific.

#### PRACTICAL CONSIDERATIONS

We must admit that things are not going en-

tirely well with this matter of alveolar infection. The dental and medical professions are crystallizing into points of view decidedly antagonistic.

You hear on the one hand that nobody, however healthy, should be permitted to retain a dead tooth, and that any evidence of a tooth abscess should be the basis of immediate extraction.

At the opposite extreme stands an equally firm and apparently logical group who hold that so-called apical granulomata may be meaningless and represent harmless efforts at localization following upon irritation, not alone bacterial but possibly toxic chemical or mechanical.

Between the two extremes stand the greatest number of careful clinicians, who are convinced that under certain conditions clinical experience has shown decided improvement following upon the eradication of definite gingivitis, pyorrhea, or the removal of inflammatory foci about the root ends.

Not many statistical reports, however, are at hand. Bryce, of Memphis, Tenn., reported at the last meeting of the A. M. A. at New Orleans, a study of 100 cases that had been relieved of surgical foci of infection in the mouth. The discussion of his paper\* by Drs. Billings, Pratt, Thayer, Solomon, and others, is particularly notable in sensing the time, and is in keeping with the caution relative to the interpretation of surgical foci in the mouth that is rapidly becoming universal. Bryce's report as to arthritis is a very limited one. His suggestions relative to a few conditions such as hypertensive states, general neurotic conditions and achylia gastrica, indicate that he also is confusing cause and effect.

#### DATA PERTAINING TO ARTHRITIS

Time will permit only the briefest reference to the work of Dr. Mantzer done in U. S. Army Hospital No. 9 at Lakewood, N. J., in association with Dr. Ralph Pemberton and others.\*\* This study was made on 397 case of arthritis coming under their observation. For the details, the reader is referred to the original article, which is in some detail. Under various headings Pemberton suggests that it is the experience gained from the results of individual cases of arthritis following the eradication of surgical foci of infection that has given this mode of attack its

\*Journal of the A. M. A., Vol. 74, No. 24, June 12, 1920.

\*\*Archives of Internal Medicine, March, 1920, Vol. XXV, Pp. 231-282; April, 1920, Vol. XXV, Pp. 335-404.

prestige, rather than the sum total of experience that one arrives at by a study of cases in groups. I quote directly from Dr. Pemberton's report:

"Although the etiologic importance of focal infection, especially in civil life, is not to be minimized, it is clear that the present group showed a considerable independence of it. One hundred and eighty-four patients, or 46 per cent, recovered in the presence of demonstrable surgical foci. This is nearly three times the number which improved (65 cases or 16.25 per cent) after the removal of foci. The tonsils were most frequently the site of infection, 52 per cent; the teeth were next, 33.5 per cent; the genito-urinary tract came last, 12 1-2 per cent, and clearly played an almost negligible role in causing arthritis."

The following results and table give briefly the findings in these "arthritis" cases from the dental point of view. Quoting verbatim: "Any condition about the mouth from which absorption might take place was considered a possible focus. Caries was divided into three classes, respectively, slight, medium and heavy, to assist the dental department in giving attention first to the most needy cases. Under 'caries slight,' are classed the cases in which the enamel was etched or just broken; under 'caries medium,' are classed the cases in which the decay had proceeded farther, but not far enough to endanger the pulp, and under 'caries heavy,' are classed the cases in which the pulp was endangered or already exposed.

"Conditions falling under the classifications 'simple gingivitis,' and 'condition of the gums, fair or poor,' were not regarded as foci, but were considered as paving the way for infection and suppuration, and were corrected immediately to prevent the deeper tissues from becoming involved. The number of cases falling under 'gingivitis, simple,' and 'condition of gums poor,' was large owing to the fact that these patients were not able to give their mouths the average amount of care. This is illustrated by the number of subjects showing salivary deposits. Under 'pockets' about the necks of teeth have been listed all cases where such conditions were found, whether suppurative or nonsuppurative. Very few of these cases were suppurative, the larger number being caused by calculus deposits, or the impaction of food between the teeth had not progressed to that degree. When ulcerative

gingivitis was present, or when there were pockets about the necks of the teeth, it became necessary for the examiner to determine whether in his opinion the condition present constituted a focus or not.

"Under abscessed teeth come the various alveolar abscesses, acute, chronic (with, and without sinus) and blind abscesses, all of which were classed as constituting foci. The Roentgen rays were resorted to when there were deep pockets about the necks of the teeth and in all cases in which there was the least possibility of an apical abscess. An analysis of 397 cases revealed the following conditions in the proportions indicated:

Caries, slight, 118; not constituting a focus.

Caries, medium, 80; not constituting a focus.

Caries, heavy, 79; not constituting a focus.

Calculus, subgingival, 211; not constituting a focus.

Calculus, salivary, 116; not constituting a focus.

Condition of gums, good, 164; not constituting a focus.

Condition of gums, fair, 103; not constituting a focus.

Condition of gums, poor, 112; not constituting a focus.

Gingivitis, simple, 216; not constituting a focus.

Gingivitis, ulcerative, 25, constituting a possible focus.

Pockets about necks of teeth, 77, constituting possible foci.

Abscessed teeth, 126, constituting foci of infection.

Incidence of abscessed teeth among all cases examined, 30 per cent.

"Only nine cases which did not have an abscess but showed either pockets about the necks of the teeth or ulcerative gingivitis, or both, were considered actual foci of infection, making a total of 135 instances or 34 per cent."

A study of the records of 105 cases diagnosed under the main heading of "arthritis," in the Duluth Clinic, covering the period of the last three years, by one of us (Tuohy), leads to very much the same conclusions. These figures, coming entirely from civil life, curiously approximate in a fair degree those of Dr. Pemberton representing young army recruits.

Of the 105 case records studied, 90 were diagnosed primarily as some form of arthritis; the remaining 15 had some other definite complication, such as diabetes, chronic nephritis or ar-



terial degeneration. (No attempt is made at this time to further classify the arthritis group into its subdivisions, except that of the uncomplicated, 51 are classed as acute and 39 chronic). The records were not all complete as to notations on teeth and tonsils and the genito-urinary tract, which was the particular object of this quest. However, considerable information was found available.

Table 1 will show a division of cases into acute and chronic, and the number of each showing tonsil or tooth infection, with the results following eradication of these foci. Of course other treatment was provided for these patients in addition. Some were not under observation very long after the foci were removed, and in the interpretation of results the individual view point of the observer could occasionally be suspected.

TABLE I.

*Cases of Arthritis From Duluth Clinic Studied  
From Standpoint of Foci of Infection in  
Tonsils and Teeth.*

July 1917 to July 1920.

|   |             |               |
|---|-------------|---------------|
| Total number of cases .....                                     | 105         |               |
| Classified primarily as arthritis.....                          | 90          |               |
| With serious associated conditions .....                        | 15          |               |
| Uncomplicated cases classified as acute....                     | 51          |               |
| Uncomplicated cases classified as chronic..                     | 39          |               |
|   | Acute group | Chronic group |
| Number showing tonsil infection .....                           | 32 or 62%   | 13 or 33%     |
| Number showing tooth infection .....                            | 17 or 33%   | 24 or 60%     |
| Improvement following tonsillectomy, 31 cases                   | 21 or 68%   | 8 or 61%      |
| No improvement after tonsillectomy .....                        | 10 or 32%   | 5 or 39%      |
| Improvement following eradication of teeth foci (17 cases) .... | 8 or 47%    | 8 or 33%      |
| Negative results or made worse .....                            | 9 or 53%    | 16 or 67%     |

Two cases each in the chronic and acute groups were diagnosed as genito-urinary arthritis.

Two deaths occurring in the chronic arthritis group (one complicated and the other uncomplicated) are especially worthy of brief mention:

A. A. J., aged 33, came for examination May 4, 1920, with a very severe pain in the right

chest and a condition which simulated asthma. He later developed polyarthritis and severe abdominal pain, probably muscular in origin, because he later developed muscular pain elsewhere. A marked effusion occurred in the right knee. The temperature ranged not higher than 101 degrees. He became anemic, with a cell count of about 3,000,000, and showed a leukopenia (4,400). Conservative measures resulted in considerable improvement, but the knee condition would relapse frequently. He left the hospital, however, after about a month, able to get about. Sometime in July, following the extraction of a few teeth elsewhere, he is said to have developed a slow, indolent mouth infection, suggesting a noma, from which he gradually succumbed.

The other man had a marked arteriosclerosis and a moderate hypertension (a separate and distinct entity), a "combination form of nephritis," and achylia gastrica. He was severely sick in any case, but teeth removal was probably injudiciously advised; he failed rapidly thereafter.

#### THE NEED OF DEFINING TERMS AND CIRCUMSCRIBING RESPONSIBILITY

Up to date, ideal methods of association of dentist and doctor have not been attained. The two professions attend their own meetings, read their own literature, and largely follow their own inclinations. This should not be. The dentist, when he becomes more than an operative reconstructionist becomes a specialist in medicine.

His problems then bear the same relation to the body processes as a whole as do those of the ear, nose and throat specialist or the dermatologist. It seems only logical, therefore, that the basic knowledge underlying the ultimate study of one medical specialty should be the same as of the other—some of the same hospital experience and attention to general pathology and physiology. If this point of view ever obtains, it is only fair to suggest that the field of the oral surgeon shall not be restricted rigidly to the teeth and gums, but include at least the mouth and accessory sinuses.

In drawing attention to definitions and pathological sequences, physicians should come to consider many tooth factors in addition to infection, a point they are prone to over-emphasize. A few

statements relative to the teeth and their im-  
placements seem opportune:

The alveolar process is made up of cancellous  
bone tissue, transitory in character.

The periodontal membrane fills the space be-  
tween the tooth root and the surrounding bone,  
and covers the root beyond the crest of the alveo-  
lar process to the junction of the root and crown.  
Its purpose is to cushion the tooth against the  
stress of mastication and support the gingiva,  
causing the latter to hug tightly about the tooth.  
The gum portion just adjacent to the tooth is  
called the gingiva, and inflammatory reaction  
in this is known as gingivitis, which is usually  
classified as follows: (a) simple (b) interstitial  
(c) ulcerative (the latter may arise from specifi-  
c sources, including Vincent's organisms.)

It is termed "simple" where only the labial  
and lingual or buccal and lingual surfaces of the  
gingivae are attacked; if it proceeds to the in-  
terproximal gum tissue you have the "intersti-  
tial" form. Allowed to proceed further, it will  
advance in the direction of the long axis of the  
tooth, attacking the periodontal membrane and  
producing a periodontitis, at first inflammatory  
but not suppurative. If allowed to become sup-  
purative it is known as pyorrhea alveolaris. This  
inflammatory train of events is always passed  
through before the ultimate pyorrhea is reached.  
Naturally, the rapidity with which the different  
stages follow depends upon the severity of the  
irritant and the patient's resistance. When un-  
checked it becomes a progressive condition. Often  
fillings have sufficient overhang and crowns  
sufficient shoulders jutting into the interproxi-  
mal spaces to be the initial seat of inflamma-  
tion; but in such cases the gingivitis or suppu-  
rative pocket, if it has progressed that far, is  
generally localized to the area in question.

#### FACTORS INCLINED TO HASTEN THE GINGIVITIS

##### TO PYORRHEA CHAIN

The factors that are best known may be sum-  
marized as follows:

- (a) Tartar.
- (b) Decay and defective dental work; im-  
proper crowns and bridges.
- (c) Mechanical irritation of gingivae (such  
as would be produced by cross brushing of the  
teeth).
- (d) Poor mouth hygiene; food lodgements.
- (e) Metabolic reactions in constitutional dis-

eases (these are legion and merit the closest  
study by physician and dentist).

(f) Faulty articulation. Bacteria or para-  
sites are secondary invaders.

Time will not permit amplification in discuss-  
ing these factors. A few will be touched on  
briefly.

Tartar is of two kinds, the result of salivary  
and serumal calculus. The first is a product  
deposited from the saliva, and in some mouths  
forms rapidly impinging upon the deep tissues,  
gradually destroying the periodontal membrane,  
alveolar process and gum tissue. Usually the  
tissue adjacent to the root is destroyed, but with-  
out the formation of pockets. The serumal type  
is a black deposit on the neck of some teeth on  
the enamel. It causes a severe inflammation,  
with the destruction of the periodontal membrane,  
and pockets result. The bulk of the tooth is com-  
posed of dentine, the root portion of which is  
covered with cement substance, and the crown  
portion of the tooth is enamel.

#### THE MUCH DISCUSSED DENTAL ABSCESES

Talbot of Chicago has defined and classified  
four general types of dental abscesses:

- (a) Alveolar (connected with sinuses in  
the teeth)
- (b) Periodontal or metastatic
- (c) Alveolar
- (d) Pulp abscesses

The periodontal are located in the periodontal  
membrane or fibrous tissue, originally alveolar  
process or in the dental pulp, and are due to  
infection from without the roots or other  
sinuses of the teeth.

An analysis of (a) and (b) brings up the  
question concerning the influence on the general  
health of gingivitis or pyorrhea alveolaris. No  
one can doubt that there is an area large in ex-  
tent, capable of infecting adjacent tissues, in-  
cluding the tonsils, the sinuses, and under cer-  
tain conditions the alimentary tract, and one  
of the common sources of the periodontal or me-  
tastatic abscess ("B"). Despite the imputation  
that pyorrhea is well drained, clinical evidence  
strongly supports the contention that it does con-  
stitute a decided potential focus of infection.

The abscess tooth group "c" and "d" repre-  
sent a feature that has been given the greatest  
attention and concerning which there are still  
many mooted points. The X-ray film deserves  
great credit for bringing these apical granulo-



mata to your attention, but it is also responsible for subordinating other conditions even more important. It is in the interpretation of these so-called root abscesses that so many patients have lost their teeth, frequently at the advice of their physician. It should be firmly insisted that the interpretation of the X-ray film and the decision for extraction should be left in the hands of the competent dental diagnostician, the closest attention being given to the clinical factors obtaining about the tooth or the area in question. The films themselves should be viewed from the standpoint of three groups:

- (a) Slight areas of radio-lucency which may be present without infection at all, and due, as Talbot claims to have proven, to chronic irritation (chemical, due to gas or foreign material).
- (b) The well defined area definitely walled off at the apex of the root, commonly termed granuloma; a circumscribed sac or mass of cicatricial tissue.
- (c) Definitely spreading invasive infection, showing only slight areas of radio-lucency, less well walled off (the more active type of infection and a more dangerous one).

Regarding the first, let us quote directly from Talbot:

"A closer study with the microscope of the pathologic changes that take place in the tissue, including simple irritation (stimulation), bone absorption and infection, inflammation and abscesses, will show us that a large percentage of so-called abscesses are not abscesses, but simply denuded tissue, with or without absorption or caries of bone." Quoting still further, "All pathology is not the result of infection."

We are able to show X-ray films which came to hand recently. They prove two things:

- (1) The value of clinical consideration of the teeth.
- (2) That all dark areas are not abscesses, the result of infection. These teeth were ordered X-rayed by a physician because they were crowned, and extracted by the dentist because they had dark areas at the apex. After extraction they were found to contain normal vital pulp, and the patient had lost two valuable molars.

In consideration of the second group, "b," the well defined area which is walled off, the published evidence concerning these is very contradictory. Theoretically, the fact that they are cicatricial tissue, have new vessel formation, and are composed of granulation tissue, indicates re-

pair and an effort of nature to wall them off and restrict their limits.

In consideration of the third group, "c" the definitely spreading invasive infection: This sort of area should certainly be cleaned up, whether it has a casual relationship to systemic states or is the result thereof. In either case, its activity is unquestioned. In these cases the Roentgen evidence is less obtrusive and may be overlooked.

#### SOME OF THE STRIKING CAUSES OF FAILURE

With these considerations we may briefly attempt to analyze why "pot shot" attention to the teeth and gums is not yielding us the results we expected:

(1) The physician and dentist have not co-operated in the beginning to make a differential diagnosis, based upon which any form of treatment has a chance to succeed, i. e., in a very large number of people given dental treatment a better ordained diagnosis, according to standard methods and ideas, will make it apparent from the start that the teeth conditions, if a factor at all, are secondary to some primary constitutional disturbance. A patient consults a doctor and he forthwith X-rays his teeth and orders them removed; the dentist's role is a passive one. No good surgeon removes an appendix at some doctor's suggestion on such a basis.

(2) A fairly large amount of tooth extraction is done at the request of the patient, who asserts that to the best of his judgment his complaints are an exact counterpart of those encountered by some friend who got relief after the removal of abscessed or dead teeth. The exodontist takes the patient's word for it and no attempt is made to uncover the true disease. Later it is learned for example that the chest pains are not constitutional neuralgic manifestations of tooth conditions, but arise from a developing aortic aneurysm.

(3) After permanent pathologic changes are present (joints, fascia and tendons) a "cure" is expected by removing abscessed teeth or correcting faulty mouth conditions. It is too late.

(4) The physician, whether wittingly or not, usurps the province of the diagnostic dentist and intimates to the patient that such and such dentistry has been bad; that there is evidence of faulty technique in root fillings; that much of our dentistry has not been done under aseptic

conditions, and that such and such teeth should be removed. In this he fails to appreciate the vital features of a good dental appraisal of the mouth which should, in a very general way, be thus considered:

- (a) The kind of individual care, as evidenced by general inspection;
- (b) Status of mucous membrane and gingivae;
- (c) The degree of gingivitis or pyorrhea alveolaris, if present. (Special attention to be given to the third molars, unerupted or erupted);
- (d) Abscessed teeth.

"A" and "b" are most important in determining the future status of questionable teeth. If "c" is present it must be primarily considered from two points of view:

- (1) Is it due to some irritant about the mouth, such as calculus, poor fitting crowns, bridges or faulty fillings? If so, it should be corrected, not from the point of removing a focus of infection but that such a condition, if neglected, is paving the way for widespread suppuration.
- (2) Is it merely a secondary condition arising out of or from a general systemic state? This feature deserves fullest consideration, and is responsible for the next *primary* difficulty.

(5) Both dentist and physician fail to acquaint themselves with the common system states that influence the teeth. One of the most common of these that furnishes an excellent example is the influence of pregnancy. Severe anemias (primary and secondary), hypertensive states, nephritis, arterial degeneration, metallic poisons, environmental, dietetic, racial and climatic variations are mentioned only to suggest that original articles be consulted concerning them, and that a broader interest, (leading observing professional men to bring into the general literature the results of their studies) will aid greatly in the future. For the dentist's aid, the physician must lend a more attentive ear, because up to date the inquiries of the former have usually met the non-committal attitude of the latter.

The opportunity I (Mentzer) had in observing a large number of diabetic patients under the care of Dr. F. M. Allen, is timely and illustrative. The prevalence of gingivitis, as might be expected, was decided, particularly if a patient showed anemia; some had progressed to a severe pyorrhea. After these patients, under medical treatment, became "sugar free," it was pos-

sible by the ordinary prophylactic treatment, removing all irritants about the mouth, avoiding chemical, mechanical and surgical trauma, to promptly clear them up. But not until they became sugar free was this possible. Every case of severe pyorrhea alveolaris cleared up in the same way, and thereafter, if any minor oral surgery had to be done, healing was as prompt and satisfactory as in a normal individual. Diabetes is widely understood by both professions to play this important role relative to the gums, but your attention is respectfully called to influences just as real, though less outspoken, in the list of conditions mentioned above. Therefore, in attacking perverted metabolic conditions as typified in chronic nephritis, for example, we will find that much more can be done to rehabilitate the mouth after the tide has been turned more favorable toward the patient by the usual measures directed to relieve the load on the cardiovascular and renal mechanism.

As each patient is studied, the objective data is developed. A good part of these data is strictly impersonal. The interpretation, on the other hand, admits of the greatest personal variations particularly as to the plan to follow. The following statements are made, therefore, with the keen understanding that others may differ and that time and further study may effect changes. Nevertheless, we must have some standards of practice, and with that intent, these are offered:

#### GENERAL INDICATIONS FOR DENTAL PRACTICE

(1) In the presence of gingivitis, of whatever form, all irritants about the mouth should be immediately removed; the constitutional factors should be given the most careful study and corrected in so far as possible.

(2) The presence of pyorrhea should be corrected. Whether the teeth should be extracted or not will depend on:

- (a) The extent to which the condition has progressed.
- (b) The patient's systemic condition and the ability of physician and dentist to improve the constitutional state.

#### CARIES

"Simple" and "medium" caries (according to the definitions above given), should always be corrected by fillings or crowns. Correcting "heavy" caries necessitates removal of the pulp, and this I believe should be done only where



free access to the canal can be obtained and an X-ray shows the roots are straight or nearly so. Such safe root fillings are possible\*

#### ABSCESS IN RELATION TO TEETH AND THEIR IMPLACEMENTS

If a tooth is definitely abscessed, particularly if it is evidencing local inflammatory symptoms, it should usually be extracted.

Regarding apical granulomata the burden of proof for extraction should be in favor of the tooth and not against it. Local treatments of straight root canals or root amputations are mechanically feasible and the results meet the indications.

I do not believe in extracting teeth simply because of apical granulomata and certainly not because of denuded areas at the apex or because the roots are not perfectly filled. If the condition is a borderline one and it is hard to determine in which class it belongs, certainly conservative attempts should be made to save the tooth, and in no case should it be extracted until other measures have been instituted, *and unless a keen differential diagnosis on the patient indicates that focal infection stands as a decided probability in the etiology of the systematic state under consideration.*

#### DEAD TEETH

A tooth should never be extracted simply because it is devitalized.

#### IMPACTED TEETH

These impacted teeth, particularly the third molars, are a great cause of reflex pain about the head and neck, and I firmly believe they should be removed.

#### IMPERFECT FILLINGS AND CROWNS

These should be corrected as well as full attention given unusual strain on any teeth the result of bridges or poor alignment or jaw deformity.

If the foregoing suggestions are followed I believe the wholesale extraction of teeth will be greatly lessened and a fair working basis for physician and dentist be established, that will

be productive of the best results to the *largest number of patients.*

#### GENERAL CONCLUSIONS

(1) Doctors and dentists should have a literature more in common; they should come together in their meetings, and aim to present to the public an opinion common to both. Our suggestions from the dental point of view are already summarized under "General Indications for Dental Practice."

(2) The dentist should not be driven against his judgment to sacrificing teeth needlessly. We as doctors should not be too hasty in criticizing the dentist's handwork.

(3) We should aim to examine the patient and make an accurate diagnosis before experimenting with shortcuts to results that sacrifice the patient's dentition.

(4) The dentist must study more carefully the constitutional evidences of tooth and gum pathology, and the physician should painstakingly analyze these constitutional disturbances that are proven to have a clinical relationship with the teeth. The connection between tonsillar infection and these general states has been much more conclusively shown than has the relation with alveolar infection and similar conditions.

(5) We should not rely on the X-ray alone to make the necessary differentiations, any more than we do on the microscope or any other mechanical agent, in directing our therapeutics.

#### REMARKS BY DR. HARTZEL

Mr. President, Ladies and Gentlemen of the Minnesota State Medical Association:

I have had the opportunity of reading the paper by Doctors W. E. Mentzer and E. L. Tuohy of Duluth, Minnesota. I regard this paper as a constructive effort to induce the dental and medical professions to take a sane and moderate view of the pathogenic problems arising from mouth infection. Their attempt to unify and standardize our knowledge of the pathology of the mouth and its secondary effects is a distinct step in advance. There is no doubt that our present knowledge of the character of mouth infections and the result of their transplantation to other parts of the body has saved and will save many lives, as I am satisfied it is true that a great deal of endocarditis, myocarditis, and a considerable percentage of acute kidney infections as well as many chronic arthritides arise from this source. It is equally true that where this happens to be the whole and only source of an arthritis, nephritis, or a myocarditis, that a brilliant result has been obtained by the dentist, and

\*Arthur D. Black, "Tabulation from 3,000 radiographic films of teeth and adjacent bone in mouths of 300 adults," supplement to address of chairman, Sec. on Stomatology, Am. Med. Assoc., N. Y. City, June 6, 1917: "Per cent of abscesses for all root fillings 47; for good root fillings 8; for poor root fillings 65."

the dentist on that account has been misled into thinking that the next case of the same character coming into his hands will yield as good a result as did the one he first treated, with a resultant swift remission of secondary symptoms.

Owing to the fact, however, that dental education does not require a broad foundation in human pathology and a wide knowledge in medicine, the dentist cannot and many times certainly does not know that oftentimes a case will present the same general symptom complex but owes its origin to some other cause or condition. Owing to his less broad training, the dentist fails to recognize this, and therefore falls into the error of promising the patient great gain, and owing to the fact that the etiological factor does not reside solely in the mouth, fails to produce through dental treatment the improved condition for which he hoped. Therefore, the effort of this paper to bring dentistry and medicine into closer cooperation, to stimulate the dentist to cooperate with the medical man at every point where he feels or knows his own power of judgment to be limited, cannot but result in great good to both professions and to the clientele we serve.

I certainly subscribe to the idea that the pulpless tooth is not a dead tooth. It has been shown conclusively that the dental pulp receives its nutriment through the apical foramen; cemento-blasts and cementum, and even the fibrillar ends of the odonto-blasts lying immediately between the cementum and dentine receive direct nutriment from the lymphatics which feed the peridental membrane. It is absolutely true that where pulps have been removed under proper aseptic precautions and the root canals hermetically sealed in those cases in which the peridental structures have not been injured, the teeth may live on and do good service for a life time. At the present time the speaker has three such dental servants in his own mouth. A life long observation of this problem as well as the personal experience in his own mouth with pulpless teeth has convinced the speaker that the crying need of dentistry at the present time is not so much the extraction of teeth as the conservation of them, and the adoption of aseptic surgery to dental pulps when such pulps must be removed. The dentist of the future will never devitalize a pulp except as an alternative to extraction. When the dental pulp becomes exposed to infection, the tooth should either have that pulp aseptically removed and the root canal hermetically sealed to prevent the ingress of infection or the tooth itself should be extracted. If the dentist feels he cannot save the tooth and prevent infection, then he should extract such tooth.

That it is possible to retain in one's mouth or in the mouths of patients pulpless teeth has been shown through at least fifty years of successful practise. On the contrary pulpless teeth, where correct efforts to shut off infection have not been

practised, cause secondary disease in other parts of the body. The speaker has fortunately had a rather broad experience in a study of arthritides brought about by mouth infections having studied between eight and nine hundred cases, but without the distinct effort to determine what proportion of these cases were due to dental infection.

It is my belief that there is unquestionably a considerable group in which dental and tonsil infection together are the joint source of this disturbance, and it should always be borne in mind that while dental and mouth infections are the most common sources of chronic arthritis that there may be other sources. Chronic intestinal stasis certainly does play an important role in this disease. An old cholecystitis of ten years' standing, perhaps with gall stones commencing to accumulate and steadily growing in size and number may be present together with mouth infection. Then there is a considerable number of cases in which we have chronic arthritis obtaining coincident with tuberculosis, and the speaker is convinced that there are a considerable number of individuals who have had secondary infection arising perhaps from the mouth or some other source, in which infection of the thyroid gland leading to atrophy of that organ and therefore a lessened thyroid activity resulted in the bringing about of a condition of a lessened metabolic rate for the individual, and made recovery impossible even though the primary focus of infection be removed. A series of such cases has recently passed through my hands,—one in particular in which the symptom complex presented casts and albumen in the urine, and a chronic arthritis of the right arm and shoulder of more than two years' duration. There was cessation of casts and albumen when the pulpless teeth were removed, but continued pain and tenderness and inability to manage the left arm with comfort. The metabolic rate in this case was minus thirty. The administration of a tenth of a grain of Burroughs Wellcome and Company's thyroid extract three times a day with no other medication has within the last six weeks been followed by complete freedom from pain and normal use of the arm and shoulder. Whether this be a coincidence or not is impossible for me to state, but it proves that a study of all the conditions that make for a spread of secondary infection from primary foci must be given complete consideration, and the more intimately the medical and dental professions cooperate the better it will be for both medicine and dentistry. It is the personal feeling of the speaker that the dental profession stands to receive greater benefit from this cooperation than perhaps does medicine, because of the fact that the educational attainments of the dentist are at the present time greatly less than those of the medical graduate, so that the kind and sincere cooperation and help granted to the younger profession by the older profession will not only cement friendship of value to



both, but will result in great good to the people served by both.

I compliment Doctors Tuohy and Mentzer not only for the paper itself but for the spirit which actuated their cooperation in the production of so valuable a document.

## A CONSIDERATION OF THE TREATMENT OF LESIONS OF THE THYROID GLAND\*

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For many years the thyroid gland was believed to function as an external protection to the larynx and trachea. Some observers believed that it emptied by a duct into the larynx, or into the pharynx or esophagus, and so had some influence on digestion. It was also believed to have something to do with the control of the circulation to the brain by direct influence on the carotid arteries. Most of these hypotheses were undoubtedly fanciful. We have only recently come to regard this ductless gland of great importance in metabolism. Our knowledge of the function of the thyroid has been obtained largely from a study of the results of total removal of the gland and a study of persons whose thyroids had never functioned.

The absence of the thyroid produces a syndrome termed myxedema, or hypothyroidism. Children with total absence of thyroid function are known as cretins; in development they never reach the stage of puberty. After complete thyroidectomy the rate of metabolism is very greatly reduced; the growth of the osseous system is arrested, especially in the long bones, the skin becomes myxedematous, and the intellect is disturbed. If the thyroid is removed from young animals the skeletal development is retarded. This is especially noticeable in the nervous system and the genital system. The skin becomes infiltrated with mucinoid substances and is dry and rough. The hair and nails are brittle. If the thyroid is removed from an adult animal, the results are the same except that the skeleton is already fully developed and does not change.

Very little has been accomplished to change the condition of cretinism in the human being. Some of the difficulties that result from the absence of the thyroid gland can be overcome by

the administration of thyroid extract, or of thyroxin, the active principle of the gland. The greatest difficulty arises from the fact that cretinism is not recognized until the condition is of long standing. A great deal might be accomplished if it were possible to recognize the condition early and institute treatment at once. Most cretins are found in institutions for the feeble minded and are several years old before any treatment is started. The change that occurs after the prolonged use of thyroid gland products is very striking, but this improvement continues only to a certain point. Many of the patients improve under the treatment and are able to walk and get about, and some of them grow several inches in height and seem brighter. At this stage there is a disappointment; apparently no matter how long the treatment is continued or what dosage is used, no further change can be made. In a few cases we have transplanted normal thyroid tissues, and in some, the thyroid tissue from a hyperplastic thyroid of a patient with exophthalmic goiter, but apparently with similar results.

Many cretins have adenomas and cysts in the thyroid. Sometimes the cysts become quite large and in several instances we have enucleated them with as little disturbance to the glandular tissue as possible, but the procedure has not offered much encouragement. Much more is accomplished with the myxedematous patient who at some time has had a normally functioning thyroid gland than with the cretin. All the changes which have taken place in the skin, hair, and nails, as well as the facial expression and mental condition, return to normal in a very short time after thyroid products are administered.

Myxedema is undoubtedly much more common than we realize and unless we are constantly mindful of its evidences it is not difficult to overlook the real condition. Quite often it is present when there is no discernible lesion in the thyroid and no history of former trouble. It is sometimes seen in patients in whom there has been a long standing adenomatous or colloid goiter, and not infrequently in those in whom apparently there has been hyperthyroidism at some previous time. I have seen several cases which followed what apparently in the beginning was thyroiditis.

Postoperative myxedema is extremely rare.

\*Presented before the Sioux Valley Surgical Association, Sioux City, Ia., January, 1921.

For many years we believed we had never seen myxedema following thyroidectomy, but since we are better able to recognize the condition we believe that some deficiency in the thyroid function occasionally follows operation on the gland. This of course can be best determined by an estimate of the basal metabolic rate after the operation. We found that it was not unusual for the basal metabolic rate to drop after partial thyroidectomy but that the drop apparently had no influence on the convalescence, and that frequently there was not clinical evidence of insufficiency in thyroid function. Apparently in operating for goiter, if a small piece of thyroid tissue is preserved with a good blood and nerve supply insufficient thyroid function will not result. It seems to me this is the better way to determine the amount of thyroid gland that must be saved in subtotal thyroidectomies, rather than to designate a quarter or a sixth or a tenth of the gland, or of one lobe. Experimentally, a dog develops just as quickly and completely with all of the thyroid gland removed except one small viable piece as with the entire gland. Following the employment of roentgen ray exposures in the treatment of lesions of the thyroid some cases of myxedema and some of tetany are being reported.

The tetany following operations on the thyroid is an interesting study. The syndrome is the same which may occur under other circumstances. Last year we observed two cases of gastric tetany following gastro-enterostomy for ulcers of the stomach. Apparently the conditions were synonymous, and in the one instance the patient's response to the treatment was the same as that following treatment for tetany with goiter. Tetany is much more common than myxedema following operations on the thyroid although it does not occur in more than 0.25 per cent to 0.5 per cent of all cases. It is more liable to follow secondary operations when partial thyroidectomies have been performed, possibly some years before, and the second operations are performed for recurrence of thyroid enlargement. In my experience the symptoms almost always begin by a sensation of stiffness in the fingers about the third day after the operation. It is difficult for the patient to raise his fingers to his mouth or to hold anything. These symptoms may pass off in a few hours or a day, possibly

after one or two doses of morphin, or the condition may gradually progress until the contractions involve not only the fingers but the muscles of the hands and arms, and sometimes they become general. Cases in which this condition has resulted fatally have been reported, although in our series of approximately twenty cases, there have been no deaths. One patient who had a suppurative pericarditis as well as tetany did not recover, but we were able to control the contractions. In one of my patients I was obliged to ligate both inferior thyroid arteries at the same operation; this patient developed tetany. All of the circulation to the parathyroids come from the inferior thyroid artery so that when both of the inferior vessels are ligated at the same time the parathyroids are deprived of their circulation. The tetany in this case persisted for seven weeks; it then subsided and there was no return of the symptoms. Collateral circulation was undoubtedly established and the parathyroids resumed their function. I believe that all patients should have intravenous injections of calcium lactate, 10 c. c. of 5 per cent solution in 100 c. c. salt solution at the time of onset. The calcium lactate administered by mouth, through the bowel, or subcutaneously controls these spasms although several doses at intervals may be required before the contractions stop. By the intravenous administration all symptoms usually subside within half an hour. Often one intravenous treatment is all that is necessary although if there is any tendency to recurrence the dose should be repeated. Undoubtedly these cases of postoperative tetany are caused by a disturbance of the blood or nerve supply to the parathyroids at the time of the operation or by trauma to the parathyroid gland itself; therefore symptoms persist until the gland recovers from the trauma, or until collateral circulation is established.

In all cases, the patient may be assured that after thyroidectomy normal mentality and all normal functions will be maintained. In performing the thyroidectomy, we always endeavor to preserve all apparently normal thyroid tissue.

For purposes of treatment and other considerations, enlargements of the thyroid can best be considered in five groups. In the first group are adolescent goiters, in the second group, me-



chanical goiters, in the third group, toxic goiters, in the fourth group, inflammations, and in the fifth group, malignant goiters.

*Group 1.* The adolescent or physiologic goiter in former years offered many difficulties in diagnosis. The enlargement in the thyroid is general throughout the gland and may attain considerable size. There may be a few small associated adenomas but usually the enlargement is due to an increase in the colloid in the gland. The patient at this time in life is liable to be nervous and to have tremor so that it is most important to make sure whether the condition is hyperthyroidism or whether the signs are all due to the adolescence. In many cases the distinction can be made by clinical evidence alone because in adolescent goiter there is no loss of weight or strength, and the tremor differs from that with hyperthyroidism. It is most important to distinguish the two types because an adolescent girl should not be operated on, even if we believe the symptoms to be due to a slight overactivity of the thyroid. If there is true hyperthyroidism surgery is the method of treatment preferred. In case of doubt conservative measures should be employed first. If the metabolic rate changes greatly and particularly if there is a marked loss of body weight the condition may quite definitely be termed true hyperthyroidism. In some instances the adolescent goiter continues to enlarge, the colloid deposits increase, adenomas form in the gland, and may become a mechanical goiter.

*Group 2.* The mechanical goiter produces symptoms only by pressure and interference with the surrounding structures. Usually it is large and troublesome because of its size, although a small adenoma may produce more difficulty than a large one, or, two small tumors may be placed so as to cause great interference. Usually pressure on the trachea causes difficulty in breathing; this is the first symptom, particularly if the patient has a cold. Pressure may be made on the pharynx or esophagus and produce trouble in swallowing or it may be made on the larynx or recurrent nerves, causing a disturbance in the voice. The larynx and trachea may be markedly displaced by irregular enlargements in the thyroid. The circulation is often interfered with, the superficial vessels over the lower

neck and chest are markedly dilated, compensating the deep pressure.

*Group 3.* There are two distinct types of toxic goiters, both of which may cause mechanical interference; they are chiefly disturbing because of the so-called toxemia which they produce. This toxemia is a result of overactivity of certain elements of the thyroid or the result of the absorption of some new product from the thyroid into the circulation. In some of the toxic cases in which there is a definite obstruction to the air passages the toxic features may be produced by a suboxidation, but on the other hand many of the most toxic cases show no mechanical interference.

Exophthalmic goiter is usually toxic from the beginning. The gland is generally enlarged and hyperplastic, and there is an accompanying exophthalmos. The second type of toxic goiter is usually a so-called innocent or possibly adenomatous goiter that has been in existence for nineteen or twenty years when the signs of hyperthyroidism develop. Exophthalmos is not common with adenoma with hyperthyroidism and the other features are different from those in exophthalmic goiter, but there is much evidence of toxemia and a severe general disturbance. The actual disturbance of function and the degeneration of tissue are more marked than in cases of exophthalmic goiter. Any form of iodine administered to these patients exaggerates all symptoms; this treatment frequently seems to help the patient with exophthalmic goiter.

Surgery offers the best results in cases of toxic goiter. A very large percentage of patients can be cured completely and permanently by thyroidectomy. On the other hand a few cases clear up spontaneously, and some are benefited by different forms of conservative treatment. Sub-total thyroidectomy cures about 70 per cent of cases of exophthalmic goiter and improves many others with very slight risk from the operation.

*Group 4.* Thyroiditis does not occur often but when it does it may present an interesting picture. The onset is usually gradual in an apparently otherwise normal gland, although sometimes it occurs in a gland in which there had been adenoma and colloid enlargements for some time. At the beginning the inflammation involves the entire gland. There is apt to be a

complaint of pain and soreness and much tenderness on touching the gland which usually is not large, but the enlargement is general. The condition may go on to suppuration. The function of the thyroid may be disturbed by the inflammation. At first there may be nervousness, tremor, and loss of weight, and other suggestions of hyperthyroidism, but as the process continues the thyroid tissue is gradually destroyed and there are definite signs of hypothyroidism. If there is evidence of suppuration I believe that it is best to open into the softened area and drain. As a general rule when the inflammation involves the entire gland I do not believe that it is a good policy to operate. The operation is difficult due to the fact that there are firm adhesions between the entire surface of the gland and the surrounding structures and furthermore it is difficult to determine what gland tissue can best be saved. Normal thyroid function is more apt to follow conservative treatment than thyroidectomy.

*Group 5.* Malignant tumors of the thyroid fortunately are rare. Sarcoma is almost never seen and carcinoma in much less than 1 per cent. Carcinoma of the thyroid which can be diagnosed as such from its hardness and attachment to the surrounding tissues may be considered inoperable. Even the cases of carcinoma operated on early are prone to recur and in a comparatively short time. It is to be hoped that with the development of the treatment of malignancy by radium something can be offered these patients.

The question is often asked by patients, "What will happen if the goiter is not removed?", or, "Is it necessary to have this goiter removed?" They often ask whether the goiter will ever become malignant, whether it will continue to increase in size, produce nervousness, or prominence of the eyes. It seems to me that it is fair to the patients to tell them that they need have little fear of malignancy, but if they notice the adenoma growing harder or if there is any other change after a long quiescent period the tumor should be removed. In several patients on whom I have operated for malignant enlargements of the thyroid, the enlargements had been noticed for twenty years or more and yet in nearly every instance the patient came for treatment because there had

been some recent change. At the time treatment is sought for carcinoma the condition is almost hopeless.

Often ordinary goiters develop to a certain size and then remain quiescent for years. Sometimes in women at menopause the enlargement takes on new life and grows larger. It is also at this time that the adenoma with hyperthyroidism type of toxic goiter develops. The patient with a simple goiter may be assured that there is very slight chance that prominent eyes will develop, although after some years she may become nervous and have the other symptoms of a toxic goiter.

All things considered the adenomas should be removed. It is certain that no other treatment will cause them to disappear although it is equally certain that some persons may live to advanced age with goiter. If the goiter is a diffuse enlargement made up more of colloid than adenoma I believe there is a possibility that it will reduce in size and disappear.

#### CONCLUSIONS

Deficiency in thyroid function is manifested by a definite clinical syndrome. In most instances in adults these symptoms disappear following the administration of the active principle of the thyroid gland. In cretins without thyroid function at any time the amount of change that can be produced by giving thyroid is limited.

Disturbances in the parathyroid function result in a definite clinical syndrome. The symptoms in these cases apparently can nearly always be controlled by the administration of calcium lactate.

The adolescent goiter is a physiologic enlargement of the thyroid and should not be mistaken for hyperthyroidism. Studies in metabolism will often differentiate the two.

Thyroid enlargements producing mechanical interferences and those resulting in toxemias are best treated by surgical means.

Malignant enlargement if seen early should be operated on although very little will be accomplished by attempting to remove the tumor if it is fixed to the surrounding structures.





## PUNCTURE OF THE ANTRUM OF HIGHMORE\*

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Puncture is a universal measure in the diagnosis of empyema of the antrum of Highmore. That more complications do not occur following puncture is fortunate, but I am convinced that all the alarming incidents, more or less serious, are not discussed in the literature.

### TECHNIC OF PUNCTURE

The usual manner of anesthesia is to insert a cotton pledget moistened with a solution of 10 per cent cocain into the inferior meatus in contact with the nasal wall of the antrum. After from six to ten minutes a trocar is inserted through the bony wall into the antrum. Some operators make the entrance in the region of the natural ostium in the middle meatus. After the antrum has been entered air is usually gently forced into the sinus through the trocar in order to make certain that the membrane has been penetrated. If pus is present in any quantity a gurgling sound is heard. When the value of puncture of the antrum is doubtful, irrigation is resorted to. Antrum puncture is essential to an accurate diagnosis of empyema. Roentgenologic interpretations are unreliable at best, but are useful in determining the size of the sinus and therefore are often a guide in investigating an antrum by diagnostic puncture. In roentgenograms I have daily noted very dark antrums which were absolutely free from infection. Also it is not uncommon for an antrum that appears normal in the roentgenogram to be infected. The most common causes for the mistaken diagnosis from the roentgenograms, are, first, unilateral thickening of the bony walls of the antrum, second, thickened periosteum or mucous membrane lining the antrum, third, hypertrophic turbinates on one side of the nose, fourth, deflected or fractured septum, and, fifth, poor roentgenograms or incorrect interpretation. The roentgenogram of an antrum will be most successfully interpreted by the rhinologist who is familiar

with the intranasal conditions and who is accustomed to reading the plates.

### COMPLICATIONS

*Syncope.* While the picture of a patient in syncope is classical, the fact that it occurs during the puncture of the antrum makes the comparatively unimportant condition seem serious. However, the pulse is usually regular, although feeble; there is little cyanosis; definite clonic or tonic twitchings are uncommon when the head is lowered the patient rapidly recovers.

*Drug poisoning.* If cocain is used in rather concentrated proportions cocain poisoning may occur. The picture of poisoning may be as varied as it is serious. In slighter poisoning the patients are langorous, excited, or delirious. In more severe cases the pupils are dilated, vomiting is frequent, and the pulse and respiration are always irregular. In the most serious cases clonic contractions are present and death occurs from paralysis of the heart and respiration. Poisoning also occurs from the use of cocain or novocain, but more frequently from the cocain since it is about five times more toxic. I am quite certain that many phenomena during antrum puncture are attributed to drug poisoning, because such reactions are feared, rather than on a careful analysis of the symptoms. In other words, when cocain anesthesia is used exclusively in a large number of cases alarming symptoms of poisoning are rarely experienced.

*Laryngeal spasm.* Laryngeal spasm does not often occur. It is caused by the anesthetic, by air, or by the sudden penetration of the irrigating solution into the larynx and trachea, causing a more or less complete spasm of the larynx. This is accompanied by some cyanosis, excitement, and coughing which are relieved rapidly without serious results.

*Air embolism.* When air is forced into the antrum air embolism occurs instantly causing paresis, and partial or complete paralysis of a definite portion of the body. Death may occur before the entrance of the air can be arrested. The localized paralysis is usually temporary, but it may be permanent. If a vital center is affected by the embolism death is immediate.

*Emphysema.* When air is forced into an antrum, emphysema of the surrounding soft tissues not uncommonly results, due either to a

\*Presented for publication November 18, 1920.

dehiscence in the bony wall of the antrum or to the fact that the trocar was not passed completely through the periosteum or mucous membrane of the antrum. Such a complication may not in itself be serious. The air is absorbed in from a few hours to a week. The crepitation and the time of its occurrence establish the diagnosis.

*Orbital cellulitis.* This complication is infrequent and due to a puncture of the bony orbit by the trocar at the time of its introduction into the antrum. It is most common when entrance to the antrum is gained through the middle meatus. The signs of inflammation of the orbit occur usually from the first to third day and are unquestionable. Emphysema of the orbit may also occur if air is forced into the orbital tissue.

*Shock.* The typical picture of shock is not infrequent following antrum puncture. The symptoms usually are quite mild and transient, occasionally alarming, and they may even result in death. Shock occurs in debilitated persons, usually in those on whom the antrum puncture is done with care and realization of the risk. The most constant symptoms in shock are those simulating faint with a low weak pulse, cold perspiration, and pale skin. After proper care the patient improves, but remains weak much longer than the patients who suffer from syncope.

*Hysteria.*—Trauma may elicit peculiar phenomena inexplicable by any organic change and for the want of recognizable symptoms they must be classed as hysteria. They occur in persons whose history and physical findings give no hint of any organic change and whose general make-up is universally recognized as neurotic. The symptoms produced from antrum puncture in these persons may simulate any or all known complications except death. The patients usually exert themselves to wild movements of all parts of the body and make noises which are distinct from those heard in patients suffering from pain. They rarely hurt themselves and seldom are relieved by sympathy and advice.

#### EXPLANATION OF COMPLICATIONS BY THE REFLEX THEORY

In a recent article by Gording very careful and thorough investigation of the complications from puncture of the antrum are reported. The

literature is reviewed, and reasons for the occurrence of complications are shown.

Gording proved that air or any solutions forced into an antrum may reflexly cause serious complications. The theory of nasal reflexes has been accepted for three or four decades. The reflexes are believed to proceed from the sensory nasal nerves to the central nervous system, through the vagus to the heart and lungs, and through the phrenic nerves to the respiratory muscles. The antrum, being supplied by the same sensory nerves as the nasal mucosa, is undoubtedly subject to similar reflexes, which can be produced experimentally and with uniform results. The practical application of this work lies in the fact that certain complications of antrum puncture present unusual phenomena most satisfactorily explained by the reflex theory. (1) The complications occur immediately after the air or fluid is introduced into the antrum; (2) respiration ceases at once in the more serious cases during any phase of respiration, but usually during expiration; (3) the pulse continues after cessation of respiration and usually is quite regular; (4) the blood pressure remains unchanged or may even be increased; and (5) tonic or clonic contracture may or may not be present.

Four cases of complication following antrum puncture reported herewith occurred in approximately 12,000 consecutive cases in the Section on Oto-Laryngology and Rhinology of the Mayo Clinic between July 1, 1917, and October 1, 1920. A fifth case (Case 4) is reported of a patient who came to the Clinic because of complications following puncture of the antrum elsewhere.

#### REPORT OF CASES

*Case 1 (236839).* Miss D. P., aged 23, came to the Clinic, July 5, 1918, for relief of neuralgic pain over the left cheek and forehead. Examination of the nose revealed pus in the left middle meatus. A diagnostic puncture of the antrum was made in the usual manner and on irrigation pus was found. Air was gently forced into the antrum without incident. Two days later a trocar was passed into the antrum through the hole made by the puncture. The antrum was irrigated and as soon as air was forced into the antrum the patient became cyanosed and respiration ceased. Artificial respiration was instituted at once and the patient recovered rapidly. The pulse remained good throughout the short time of the accident. The patient noticed that her right cheek felt



numb and on examination the lower two divisions of the fifth nerve were found not to be functioning and the arms apparently were paralyzed. The arms felt normal within a few minutes and the paresis of the nerve cleared up in the course of a few hours. Air was forced into the antrum on many occasions later without incident.

I believe that the cause of the respiratory failure in this case was a reflex contracture of the bronchioles as a result of the air being forced into the antrum. The paresis of the arms and the lower two divisions of the fifth nerve is a mystery. The first thought is of embolism, but this is very doubtful because, first, the paresis was transient and, second, because at least two emboli would have been necessary to cause the paresis of the face and arms. The patient was extremely neurotic. Hysteria could very easily produce the picture and no doubt was wholly or partially responsible, but the exact cause of the complication is indefinite.

*Case 2 (246332).* Mr. T. S. R., aged 37, examined Sept. 21, 1918, was referred from the medical section for examination of the nose on account of the nasal obstruction. Large multiple polyps and pus were found throughout the right side of the nose. In order to determine what operative measures on the antrum were necessary a diagnostic puncture of the right antrum was made at the time the polyps were removed. One attempt to get a trocar through the thick bony wall of the inferior meatus into the antrum failed. The next day it was accomplished with considerable force. The sound of air inflation was clear; the antrum was irrigated without removing the trocar. As soon as the fluid entered the antrum there was a marked swelling around the right eye and right cheek. Irrigation was stopped; the patient was put to bed with ice bags and the following day the eye and cheek had returned to normal.

I believe this was a clear case of a dehiscence in the antrum wall and the resulting escape of fluid into the soft tissues.

*Case 3 (250237).* H. C. A., a man aged 42, came for examination in the Clinic Nov. 5, 1918, chiefly because he had had almost daily severe bilateral frontal headaches since an attack of influenza five weeks before. He had suffered from such headaches for five years but following influenza they were worse. They began about midnight and lasted until morning and were intensified by stooping, coughing, and sneezing. A discharge had escaped from the nose the last three weeks. A family history of pulmonary tuberculosis worried the patient. He had been weak, nervous, and unable to continue his business after having the influenza, but he had not felt strong the last five years.

The general examination revealed rales in both apices. The roentgen ray of the chest showed some bronchial thickening. The patient had a leukocytosis of 11,000. The Wassermann test was negative. There was a seborrheic dermatitis about the scrotum, anus, and legs. On examination of the patient in the Sec-

tion on Oto-Laryngology, pus was found on the posterior pharyngeal wall. The left bulla ethmoidalis was enlarged and edematous. A moderate combined type deafness, more pronounced in the right ear, was noted.

A diagnostic puncture of the left antrum was decided on in order to rule out this sinus. A small pledget of cotton moistened with 10 per cent solution of cocain was placed in the left inferior meatus and after six minutes removed. A trocar was inserted into the antrum without any trouble and air was forced into the antrum. The patient fell over at once. Respiration apparently ceased in expiration. The patient was not cyanosed, and there were no twitchings or convulsions. A pulmotor was used for two and one-half hours. A medical consultant reported a pulse palpable at the wrist for about one-half hour after the patient was apparently dead.

Necropsy revealed air embolism of the heart, lungs, liver, spleen, and greater circulation, chronic valvular endocarditis, severe dilatation of the right auricle and ventricle, subsiding bronchopneumonia, bronchiectasis of the right base, chronic parenchymatous nephritis, and hyperplasia of the spleen. Because of the air found throughout the greater circulation and viscera, air embolism was named as the cause of death by the pathologist.

That the air in the circulatory system and viscera was not the cause of the death cannot be proved, but since respiration stopped immediately on puncture and the heart continued to beat for some time, air embolism may be ruled out as the chief cause of death. Moreover the amount of air injected in the puncture was infinitely less than the amount found at necropsy; this fact may best be accounted for by the action of the pulmotor in forcing air into a vessel in the mucous membrane of the antrum and so causing the immense amount found at necropsy. Death, I believe, can be explained best by respiratory failure caused by reflex stimulation, resulting in respiratory paralysis.

*Case 4 (314283).* B. M., a girl, aged 4, was brought to the Clinic May 1, 1920. Six weeks before her mother had noted a swelling over the right side of her nose. The lump was hard but neither red nor painful. Six weeks later a local physician had been consulted, who believed the condition to be empyema of the right antrum, and a diagnostic puncture of the antrum was made. Immediately the right eye became swollen shut and the surrounding soft tissues were red and prominent. The doctor and the child's mother decided to come to the Clinic at once.

At the time of our examination the child had some pain but it was not excruciating. A roentgenogram revealed that the upper wall of the right antrum and the orbital wall were much more dense than the wall of the left antrum. A diagnosis was made of empyema of the antrum with definite and marked orbital cellulitis resulting from an antrum puncture. Local suction treatment was instituted, followed in four

days by a window resection into the antrum through the right inferior meatus. On the sixth day there was fluctuation in the lower eyelid, and a large deep incision was made with the escape of much pus. The child was treated daily for three months. At the end of this time the orbital cellulitis had subsided, and the antrum infection was cleared up but the lower lid showed a slight ectropion caused by a small draining fustula in the center of the original incision. A plastic operation on the lower lid will have to be done later.

The orbital cellulitis and infection of all the soft tissue about the eye and cheek, was undoubtedly caused by the insertion of the trocar through the antrum and bony orbit into the orbital fat.

*Case 5 (313653).* Mrs. L. F. K., aged 51, was examined in the Clinic June 8, 1920. The patient had had nasal discharge and headaches since a number of upper teeth had been extracted two years before. On examination of her nose pus was found on the floor of the left nares. A diagnostic puncture of the left antrum was decided on. A small pledget of cotton moistened with 10 per cent cocain was inserted in the left inferior meatus for six minutes and the puncture made. Air was forced into the antrum, and the gurgling sound typical of the presence of pus was heard. Irrigation proved pus to be present and air was again injected to force out the fluid. No unusual incident was noted until at a second repetition of the procedure six days later, air was forced into the antrum after irrigation had been finished. Emphysema occurred immediately around and below the left eye and in the left cheek. The stream of air was stopped and the patient put to bed with cold compresses over the affected area. Within twelve hours the emphysema had disappeared.

The cause of this accident is difficult to explain. It was not due to improper insertion of the trocar because air was injected without incident before irrigation. The trocar was left in place until the accident occurred. It is most likely that the air injected under greater pressure than the first time was forced into a dehiscence in the wall of the antrum. After the patient's rapid recovery the antrum had re-

peated injections of air and liquids in the subsequent treatment of the infection without any symptoms.

#### SUMMARY

Inasmuch as complications occur from antrum puncture it is the duty of specialists carefully to perfect the technic so that every possible means of error is eliminated, and to observe certain details.

The swab of cotton used in anesthetizing need not be large if it is placed at the point the puncture is to be made.

The anesthetic solution should not be concentrated and should only moisten the cotton.

The actual puncture should be made with force under perfect control. Care should be taken to make certain that the periosteum and mucous membrane of the antrum have been pierced. The opening may even be enlarged as an extra precaution. If much bleeding accompanies the puncture, the procedure should be postponed a day or two in order to allow the blood vessels to close. Air should be introduced by means of a hand bulb, and, if more pressure is desired for a diagnosis, air under low pressure may be used with precaution. The solution for irrigation should also be introduced with care. It may be preferable to puncture the antrum through its normal ostium in the middle meatus.

If any objective or subjective changes occur during puncture the procedure should be interrupted at once.

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May, 1921

No. 5

## EDITORIAL

### LIFE EXTENSION

The study of vital statistics is of special interest to the medical man. It must be recognized that conclusions derived from such a study, to be at all valuable, must be undertaken by experts.

An interesting article appeared recently in the Literary Digest which presented the views of Dr. Louis I. Dublin, of the Metropolitan Life Insurance Company, and Dr. Eugene Lyman Fisk, Medical Director of the Life Extension Institute.

Their experience establishes, quite well, the fact that in recent years the mortality rate in the United States has shown a definite decline. This does not mean, however, that Americans live to a riper old age than formerly, but the contrary is true; for the progress made in the fight against infant mortality has saved so many lives that the actual shortening of life of the average American has been more than counterbalanced.

That the general death rate should be actually lower than it was twenty years ago is quite surprising when we consider the greater complexity of life which has developed in even this

short space of time. Deaths from automobile accidents alone, in one county of our state for 1920 numbered thirty-six. The total for the country can be surmised. How the death rate can have shown a decline during the past five years, in spite of the influenza epidemic and the war, is almost incredible.

It is the belief of Dr. Fisk that there is a marked rise in the mortality rate in the years just beyond the meridian of life, which is typically American. This is attributed to an increase in the incidence of cardio-vascular and nephritic disease. One of the main reasons for the Life Extension Institute is the combating of these diseases through early detection and the institution of proper personal hygiene as well as medical treatment.

Dr. Dublin, in a further inquiry into this apparent shortening of the span of years, has made the interesting discovery that the native born American of native parentage lives to as ripe an old age as his forefathers. The foreign element, however, is shorter-lived and shows a high mortality in the years just beyond middle life.

It is reasonable to suppose that certain factors account for this difference. The native American can be assumed to be better situated economically. The vulgar rich constitute only a small percentage of the total, and the dissipation generally attributed to at least some of these would not materially affect the sum total. Better incomes afford more opportunity for relaxation, and although we Americans do not compare with the Britishers or even our cousins, the Canadians, when it comes to physical or mental recreation, we are improving in this respect. While physical exercise is desirable, the laboring man or woman is, on the average, not to be compared physically with the better paid and brainier individual when the three score year mark is reached.

The medical profession will do its share towards the prolongation of life as it concentrates on the diagnosis of early degenerative change, and cooperates with a distinct tendency on the part of the laity for periodical preventive examinations.

## CONTAGIOUS DISEASES AND THE SCHOOL

It is the general experience in City Health Departments that contagious diseases are much more prevalent in the winter months than in the summer. The school is in a large part responsible for this fact. Close contact in the school room offers ideal opportunity for the spread of diseases, whether proven of bacterial origin or not, through the actual transfer of the bacteria by sneezing, coughing, actual touch, or what not. Recent experience in the army only served to confirm the advantage of distance and fresh air in the maintenance of the health of the individual soldiers.

Vaccination will definitely prevent a certain number of diseases, namely: small pox, typhoid and para-typhoid, and probably diphtheria. The likelihood of contracting whooping cough and influenza may possibly be diminished through vaccination. Universal vaccination will ever receive opposition, and authorities disagree how far vaccination should be carried in school children particularly. The recent wave of smallpox which has just been sweeping the entire country, though not malignant, has been costly from the standpoint of suffering and expense. The present para-typhoid epidemic in our State University is regrettable. The universal prevalence of diphtheria is anything but negligible. The seasonal prevalence of influenza, probably in excess of the average although it is too early to determine definitely, is probably the burning out of the epidemic wave which reached its height in the fall of 1918.

Universal repeated vaccination in the schools would prevent the bulk of the smallpox, typhoid and diphtheria.

The necessity for daily health inspection in the schools in the control of disease cannot be overemphasized. Most cities have far too few school nurses. The parochial schools, with an enrollment almost equal to that of the public schools, have little or no health supervision. Even a perfunctory observation of the pupils, if it amounts to no more than checking up those returning to school following an absence, prevents much contagion. However, as long as the "common cold" is ignored much will be left to be desired in the control of school contagion.

An interesting phenomenon has been noted by the Detroit Department of Health which suggests the value of school health inspection. The following shows the shifting of the prevalence of scarlet fever and diphtheria from autumn to spring, as shown by the mortality statistics.

### Scarlet Fever.

| Years   | Autumn<br>(Oct. to Dec.) | Spring<br>(April to June) |
|---------|--------------------------|---------------------------|
| 1900-04 | 27                       | 21                        |
| 1905-09 | 34                       | 23                        |
| 1910-14 | 14                       | 35                        |
| 1914-17 | 16                       | 38                        |

### Diphtheria

| Years   | Autumn | Spring |
|---------|--------|--------|
| 1900-04 | 40     | 18     |
| 1905-09 | 35     | 20     |
| 1910-14 | 33     | 20     |
| 1914-17 | 30     | 27     |

It is quite reasonably suggested that school inspection being on the increase in recent years, accounts for the more gradual approach to the height of the prevalence curve. In other words, if it were not for the school nurses these contagious diseases would quickly spread soon after the schools opened in the fall and the incidence would decrease towards spring.

Those informed realize how epidemics would thrive were it not for the work of the school nurse and physicians, and the cooperation of the local Health Departments.

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## NEW ASSISTANT EDITOR

The Journal is pleased to announce the acquisition of the services of Dr. Everett K. Geer as Assistant Editor. Dr. Geer's special interest will be the Book Reviews.

This department of the Journal has in the past reviewed only books submitted by publishers. In the future such contributions will comprise the majority of the books reviewed. Certain exceptionally good books however appear which are not numbered among those submitted for review. The Journal would appreciate reviews by any of its readers of any books as they appear which are of particular value in their special spheres.



## WHO FIRST GAVE CHLOROFORM IN MINNESOTA?

ASA W. DANIELS, M. D.  
*Pomona, California.*

By whom and where chloroform was first given in Minnesota may become an important historical question in the future. Although chloroform was discovered in 1844, it did not become generally used by the profession until after 1850. The larger cities and the army were the first to adopt it officially. At that time Minnesota was a territory, becoming a state in 1857, therefore we could not expect its early use there. My claim for having first given chloroform in Minnesota rests upon an operation performed near Fort Ridgley, June 1854, where chloroform was given.

In June 1854 Fort Ridgley was in the course of construction, and was not fully completed for several years. It was a three company post, one hundred and twenty-five miles west and south of St. Paul, on the north bank of the Minnesota river, built to protect the whites from the Indians. The Sioux Indians, by treaty, were located twelve miles west, where the government was assisting them to become farmers.

Dr. Hassen, Army Post Surgeon at the Fort, had secured a leave of absence for three months, and it was arranged that I should act as his substitute during his absence. My service commenced early in June 1854. Soon after, a messenger came from Joseph Lafrombois, a Canadian French Indian trader, living four miles west of the Fort, stating that his son, eighteen years old, had been seriously hurt by gunshot, and that I should make all speed possible in coming to his relief. Taking the hospital steward and the necessary medicines and instruments, we were soon on our way.

Reaching our destination, it was seen that a band of Indians were there in camp—their tepees surrounding the house and trading post. The room where the injured boy lay was filled with Indians—all anxious to learn of his condition. The father was told that nothing could be done until the room was cleared. All soon left the room, with the exception of a half dozen Indian doctors, who begged to remain, that they might

tell their people what was done by the White man's doctor.

The father told me that while his son was handling his gun the discharge took place when his hand was on the muzzle; that the bleeding had been alarming, and they had tried to assuage it with bandages. It was found on removing the clothes that the hand had been blown to fragments, and that an amputation was necessary. The father was so informed, but that chloroform would be given, and the operation would be without pain. The amputation he had expected, but of the chloroform he had never heard.

Chloroform was given, the boy responding nicely to its anesthetic effects. The operation was proceeding in the usual manner, when the mother—an Indian woman—rushed from the room wailing bitterly. The cry was taken up by the women outside, and the whole camp was soon in an excited condition. Nevertheless the operation was progressing, and I asked the father the cause of the disturbance. He said that one of the Indian doctors had told the mother that the boy was dead; that frightened her and the cry commenced. On being assured that the son would come from his sleep "all right" after the operation, the excitement slowly quieted down. The amputation completed, the boy soon came out of his sleep to the delight of his parents and the whole Indian band that had shown such a sympathetic interest in his recovery.

All wanted to know if there had been pain, if he was sick from the strong medicine, and if he knew of the operation. To all of which he declared that he knew nothing after breathing the medicine—all was nothing but quiet sleep. All were happy over the result, and the doctor was praised from every camp. Declaring that he was Pazuta Weechaster Wahcon—"the medicine man possessed by the Great Spirit."

For two weeks the boy came to the Fort for the hand to be dressed. His recovery was uneventful. He grew to manhood in that vicinity, and was well and favorably known.

209 W. Pearl St.



## NEWS OF THE HOSPITALS

On the evening of April 6th the Mounds Parks Sanitarium held a monthly alumni meeting.

St. Lukes Hospital, St. Paul has enlarged the windows of the lower floor to promote the comfort of patients throughout the summer months.

St. Johns Hospital has been entirely repainted and redecorated and a basal metabolism apparatus has been installed. Dr. T. L. Birnberg, chief of the Pediatric Division, has completely recovered from his operation and is again serving on the staff. Miss L. Gilkey, a graduate of the hospital in 1919, was recently appointed Night Supervisor.

Miss Ida Hummel, Assistant Superintendent of the Eitel Hospital, Minneapolis, attended the A. N. A. convention which was held at Kansas City from April 8th to 13th.

Recently the Northwestern Hospital, Minneapolis, erected a new ward, which will contain sixteen beds for convalescent men patients.

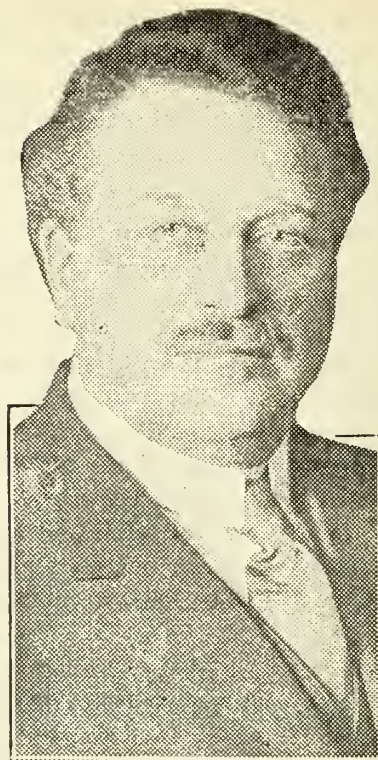
The South Side Sanitorium, Minneapolis, is undergoing a complete renovation.

Four needles have been added to the radium supply of the Swedish Hospital, Minneapolis; this institution is contemplating the erection of a new Nurses' Dormitory, which will accommodate about one hundred nurses. A swimming pool and other such recreational facilities are to be features of the new building.

On May 10th the annual meeting will be held at Fairview Hospital, Minneapolis. It is reported several new members will be added to the staff at that time. The hospital will be completed throughout by June 1st, when it will be possible to admit seventy-five additional patients.

On March first the Asbury Hospital, Minneapolis, was formerly opened as U. S. Public Health Hospital, Number Sixty-eight.

St. Mary's Hospital reports that it has transferred all of its convalescent service men to Asbury Hospital.



ARTHUR J. GILLETTE

In the death of Dr. Arthur J. Gillette, Minnesota and the Northwest has suffered a great and enduring loss. He was a pioneer in the field of Orthopedic Surgery and when that specialty was still in its infancy he brought Minnesota to the front rank in this field. He caused Minnesota to see, appreciate and attack the problem of the crippled child a long time before most of the States realized that such a problem even existed. As a result—there stands today the model Institution at Phalen Park—a monument to its founder and a dispenser of past, present and future blessings the value of which can never be measured in terms of money alone.

It is unnecessary to write of Arthur Gillette's prominence in the field of Orthopedic Surgery; of the many honors bestowed upon him by the Associations of which he was listed a member; of his numerous and able contributions to the literature of his specialty. All of that is a matter of record and is well known.

In him there passed away a man; a real and lovable man. He was of unexampled buoyancy and good cheer which radiated from him and contributed not a little to his great professional success. He was of wide culture and interested in many of the fine things of life outside of his profession. To the younger members of his profession he was always a wise and honest counselor and a good friend. He excelled as a teacher; his enthusiasm was contagious. His lectures were masterpieces because he was a master of his subject. Those who knew him best loved him most.

EMIL GEIST.

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## OBITUARY

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J. C. Farmer, M. D., McKinley, Minn., University of Minnesota 1895; member St. Louis County Medical Society and Minnesota State Medical Association; died Feb. 10, 1921.

Flora L. Aldrich, M. D., Anoka, Minn., University of Minnesota 1887; died March 19, 1921.

John C. Stout, M. D., Oakland, Calif., American Medical College, St. Louis, 1878; aged 74; died January 7th, 1921.



## MEMORIAL

to

ARTHUR J. GILLETTE, M. D.

The name of Arthur J. Gillette has to be added by the Faculty of the Medical School of the University of Minnesota to the long chapter roll of its remembered and honored dead. To review the record of his life is to measure the regret of his associates that he has gone.

Success comes to many, as it came to him; but success with distinction is won, as he won it, by few. The genial nature, the kindly humor, the punctilious courtesy, the careful professionalism, like the diagnostic fingers and the analytic mind of the man, were peculiarly his own. There was a strongly personal quality in everything he did which made for the large sum of appreciation he received from his fellows.

He was essentially a son of his State. One of the pioneer students of medicine in Minnesota, he attended the Minnesota Hospital College from 1883 to 1885; he transferred his allegiance to the reorganized St. Paul Medical College in 1886; and he graduated in that year. In 1903 he took the ad eundem degree of the University of Minnesota.

In 1895 he began his notable career as a medical educator, accepting, first, an instructorship in Orthopedics; becoming a clinical professor in 1897; a full professor of orthopedic surgery in 1898; and taking charge of this Division in 1913.

In 1915 he resigned, as he said "in favor of some younger and better man". Urged by the Faculty to withdraw his resignation, he consented to continue his work but left his resignation in the hands of the school to be considered whenever the time should come to determine the limit of his usefulness. That time did not come and his resignation, still on file, has been accepted by death.

The one great ambition of his life, The Hospital for the Crippled and Deformed at Phalen Park, the first institution of its kind in America, stands as his personal and professional monument. He conceived it; he inspired the gift of the acreage upon which it stands; he framed and promoted the legislation which created it; he superintended its construction; he directed its activities throughout its history; he determined that its staff should be of the University Faculty. A model of its kind, a noble institution of the State, an educational asset to the University, it has been, under his inspiration, more than all these,—a place of light and leadership, of human love and human service.

Service was the key-note of the life of Arthur Gillette; its one great purpose to promote the happiness of the handicapped. The smiles and the laughter of little children whose lives he lengthened, whose sufferings he assuaged, whose deformities he corrected, whose health he restored, whose usefulness and satisfaction he assured, will be his welcome in the world to which he has gone, as they were the light and the music of the world that he has left.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

## AMERICAN MEDICAL ASSOCIATION

The annual meeting of the A. M. A. will take place this year in Boston, Mass., June 6-10. Physicians contemplating attending this meeting are referred to information regarding railroad rates from Minnesota given on page 1013 of the A. M. A. Journal of April 9, 1921. Identification certificates may be procured from Dr. A. R. Craig, Sec. A. M. A., 535 No. Dearborn St., Chicago. The special round trip rate of a fare and a third from Minnesota to the New England boundary is of particular interest to physicians in Minnesota.

The American Proctologic Society will hold its twenty-second annual meeting in Boston June 3, 4 and 6, 1921. The headquarters will be at the Hotel Braemore.

The fifty-second annual meeting of the American Medical Editors' Association will be held at the Hotel Lenox, Boston, on Monday and Tuesday, June 6th and 7th, 1921, under the Presidency of Dr. H. S. Baketel, editor of the Medical Times. A novel feature of the literary program will be introduced this year in the shape of a symposia, which will be discussed by various members. The subjects will be: "Group Practice and the Diagnostic Clinic"; "What should be the Attitude of the Profession toward Health Centers", and "The Correlation between Editorial, Advertising and Subscription Work". Every doctor, even remotely interested in medical journalism, will find it to his advantage to attend, and is most cordially invited.

The Minnesota Pathological Society of the University of Minnesota Medical School held a meeting on Tuesday evening, April 19th. The program was conducted by Drs. W. E. Camp, Harold Rypins, George D. Head and Reuben A. Johnson. Discussions were opened by Dr. H. L. Ulrich and Professor Leory S. Palmer.

## OF GENERAL INTEREST

Dr. W. G. Strobel, formerly of Welcome, is now associated with the Duluth Clinic.

Dr. Charles L. Sherman, of Luverne, has been spending the past few weeks in California.

At a recent election of city officials at Bemidji, Dr. E. A. Shannon was again elected city physician.

Dr. Thurston William Weum, of Minneapolis, announces the removal of his offices to 607 La Salle Building.

Dr. B. S. Bohling, of Sandstone, is in Chicago for a month where he is doing special work in one of the large hospitals.

Dr. Robert Emmett Farr, of Minneapolis, has been invited to present a paper before the New York

State Medical Association in Brooklyn, on May 5th, 1921.

Dr. R. I. Stewart, of Wendell, was recently appointed medical examiner for the Bureau of War Risk Insurance for Grant County.

Dr. and Mrs. William MacCarty, of Rochester, have recently been in the East. Dr. MacCarty attended a medical meeting at Cleveland.

Drs. K. A. Danielson, A. W. and W. P. Robertson, of Litchfield, attended a recent meeting of the West Central Minnesota Medical Society at Willmar.

Dr. R. D. Gardner, of Eveleth, has moved to International Falls where he will engage in the practice of medicine. He will be associated with Dr. B. F. Osborn.

Dr. and Mrs. J. L. Adams, of Morgan, who have been residents of that place for over thirty years, have gone to Van Nuys, California, where they will make their future home.

Dr. A. H. Nerad, who has been practising medicine at San Diego, California, for the past two years, has recently located at Argyle, Minnesota, and is associated with Dr. A. S. Holland.

Dr. Ben Gallagher, who has been connected with the Mayo Clinic at Rochester since his return from service, is now located in Waseca where he will be associated with Dr. Swartwood.

Dr. G. A. Miners, who has recently completed two years work in the General Hospital, Minneapolis, has located at Brownton, Minnesota, where he will engage in the practice of medicine.

Cloverton, Minnesota, is without a physician. This is a very prosperous community, well settled and thriving. Full information as to this location can be obtained by addressing A. N. Langelier, Box 21, Cloverton.

Dr. William C. MacCarty, of Rochester, recently addressed the Public Health meeting, which is the second of a series of lectures arranged by the Public Health Committee of the Civic and Commerce association of that city.

Dr. Royal N. Chapman, Assistant Professor of Entomology, of the University of Minnesota, delivered a lecture March 15th before an open meeting of the Mayo Foundation Alumni Chapter of Sigma Xi; his topic was, "The significance of ecological research in entomology and its application to certain problems of national interest".

The Associated Physicians Clinic, composed of fifty Minneapolis physicians, has filed articles of incorporation with the Secretary of State. The incorporators, who also comprise the board of directors, are: Drs. Arthur T. Mann, Henry C. Stuhr, John M. Lajoie, Arthur E. Benjamin and Frank S. Bissell. Dr. Bissell has been elected secretary of the clinic.

Dr. Edward Lissack, of Concordia, Missouri, who has recently become associated with Dr. H. A. Miller, of Waseca, Minnesota, wishes a correction made in the news item which appeared in the April number of MINNESOTA MEDICINE. Dr. Lissack is not a specialist, but a general practitioner, giving special

attention to the diseases of the eye, ear, nose and throat.

The Interrurban Academy of Medicine held a clinical meeting in Duluth and Superior on March 16, 1921. Surgical and medical clinics were conducted in St. Luke's and St. Mary's Hospital, Duluth, and St. Mary's Hospital, Superior, during the day, and the evening meeting was addressed by Dr. T. R. Martin and Dr. W. E. Ground. There were about twenty-five visitors and it is planned to have a much more elaborate and extensive meeting sometime during the coming summer.

## NEW AND NON-OFFICIAL REMEDIES

During March the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies.

### Abbott Laboratories:

Tablets Acriflavine-Abbott 0.46 Grain.

### Armour & Co.:

Ampoules Pituitary Liquid-Armour 0.5 Cc.

### Hynson, Westcott & Dunning:

Sterile Ampoules of Benzyl Benzoate-H. W. D.

### E. R. Squibb & Sons:

Arsphenamine-Squibb.

Neoarsphenamine-Squibb.

Sodium Arsphenamine-Squibb.

**Acriflavine-Heyl.**—A brand of acriflavine (see New and Non-official Remedies, 1921, p. 22). Heyl Laboratories, New York.

**Proflavine-Heyl.**—A brand of proflavine (see New and Non-official Remedies, 1921, p. 23). Heyl Laboratories, New York.

**Calcium Cacodylate-IPCO.**—A brand of calcium cacodylate (see New and Non-official Remedies, 1921, p. 50). Intra Products Co., Denver, Colo.

**DuBois Iodoleine, Injectable, Ampoules, 2 Cc.**—Each ampoule contains 2 Cc. of DuBois iodoleine (see New and Non-official Remedies 1921, p. 153). David B. Levy, New York.

**Tincture of Digitalis Fat-free-Squibb.**—A biologically standardized fat-free tincture of digitals corresponding in drug strength to the U. S. P. tincture of digitalis. E. R. Squibb & Sons, New York (Jour. A. M. A., March 5, 1921, p. 655).

**Solution Arsphenamine-Lowy 1 per cent.**—An aqueous 1 per cent solution of arsphenamine, possessing the proper degree of alkalinity. The solution is supplied in ampoules containing 40 Cc. (0.4 Gm. arsphenamine) and 60 Cc. (0.6 Gm. arsphenamine). These ampoules should not be used after the date stamped on the label of each package or if the degree of coloration of the solution is greater than that of a control tube which accompanies the package. A sterile needle for intravenous injection and sterile rubber tubing accompanies each ampoule. The Lowy Laboratory, Inc., Newark, N. J.

**Ampoules Pituitary Liquid-Armour 0.5 Cc.**—Each



ampoule contains 0.5 Cc. pituitary Liquid-Armour (see New and Non-official Remedies, 1921, page 222). Armour & Co., Chicago, Ill.

**Tablets Acriflavine-Abbott 0.03 Gm.**—Each tablet contains 0.03 Gm. acriflavine-Abbott (see New and Non-official Remedies, 1921, p. 21; Jour. A. M. A., March 26, 1921, p. 859).

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

F. J. HIRSCHBOECK,  
FIDELITY BLDG., DULUTH.

THOMAS A. PEPPARD  
LA SALLE BLDG., MINNEAPOLIS

**THE TREATMENT OF ADVANCED HEART FAILURE:** Cary Eggleston (Med. Clin. of No. Amer., July, 1920). The subject is considered under four main divisions: (1) General management; (2) Use of drugs acting upon the heart; (3) Symptomatic treatment; (4) After treatment and prophylaxis.

Rest, both mental and physical, is the most effective measure we have for relieving the work of the heart. The patient should assume whatever position he prefers. Sleep is even more important than rest. Sedatives and hypnotics should be used when possible rather than morphine. Chloral hydrate is the most effective and safest of all simple hypnotics; useful to combine with the bromides. When necessary use morphine.

The diet should be simple, readily digestible, and not too abundant and of relatively low protein content. The bowels should be evacuated daily, and not allow patient to strain.

For direct influence upon the heart and circulation the members of the digitalis group are alone of importance. For the purpose of very rapid digitalization one may employ the body weight method. The relief of edema may be had by salt and fluid restriction or by the Karell diet. Theocin and theobromin are of value.

The first essential is to treat the patient until the damaged heart has regained the maximum of reserve power left. The prevention of a recurrence of heart failure should be begun during the period of convalescence.

FRANK W. SPICER.

**THE PREVENTION AND SERUM TREATMENT OF LOBAR PNEUMONIA:** Russell L. Cecil (Med. Clin. of No. Amer., July, 1920). Statistical evidence has shown that pneumococcus vaccination does establish an immunity. At Camp Upton, 12,519 men were vaccinated with a pneumococcus vaccine of Types I, II and III, and no cases of these types developing.

In a control of 20,000 men, 26 cases developed. Strangely enough, only 17 cases of Type IV and the streptococcus pneumonia developed among the group of 12,519 men, while there was a total of 173 cases of all types among the control of 20,000.

In a series of cases of pneumococcus Type I pneumonia, at Rockefeller Institute, treated with pneumococcus Type I serum, the mortality rate was 7 per cent, while in the untreated with this serum, the mortality was 25 per cent. Experiments on monkeys corroborate clinical evidence.

Cecil describes the method of serum administration and says: "The points to be emphasized in serum treatment are: (1) The administration of serum at the earliest possible moment; (2) Frequent injections of serum; (3) Sufficiently large doses of serum. Failure to achieve favorable results is usually due to violation of some one or more of these rules."

The author calls attention to the thermal reaction, the anaphylactic reaction, and the serum sickness, and concludes by stating that "we have in Type I anti-pneumococcus serum a therapeutic agent of great power and efficacy".

FRANK W. SPICER.

**THE TREATMENT OF NEUROSYPHILIS BY THE INTRASPINAL ROUTE:** Albert Keidel and Joseph Earle Moore (Johns Hopkins Hosp. Bul., Nov., 1920). The authors report a clinical study made by them on twenty-five cases of neurosyphilis treated from the point of view of increased permeability of the meninges. They review the objections by some of the principal authors to the intraspinal form of treatment, and also discuss the question of permeability of the choroidplexus and the meninges. Their own method of investigating the latter was essentially the administration subdurally of small amounts of mercury (Method of Byrnes) followed in twenty-four hours by an intravenous injection of arsphenomine. Maximum irritation of the meninges and maximum arsenic concentration in the blood were expected in this formula to be attained at the same time. A course of treatment comprised usually a series of six weekly administrations.

Clinical details in their twenty-five cases are given in tabular form.

They conclude that their own method is unsuccessful. Serological results were particularly bad. The unfavorable comparison to the Swift and Ellis method or to the Ogilvie modification thereof was quite striking.

Incidentally they noted also the unfavorable comparison between the Byrne and the Swift and Ellis methods in their own cases, as well as in those of other observers.

Attention is also called to experiments on different animals reported in the literature to demonstrate permeability of the choroid plexus. The inconsistent results obtained from various species of animals, they feel, suggest the possibility of a selective menin-

geal activity hitherto unmentioned and it would seem therefore difficult to assume that in man spinal drainage or the production of aseptic meningitis increased the permeability for drugs on the basis of animal experiment.

The authors' conclusions are:

1. Intraspinal therapy is a necessary and rational adjunct in the treatment of neurosyphilis which fails to respond to routine antisyphilitic treatment.

2. The mode of action of intraspinal medication does not depend upon increased permeability of the meninges.

3. Aseptic meningitis produced by intraspinal injection of irritants may prove an untoward rather than a beneficial factor in the treatment of neurosyphilis.

J. C. MICHAEL.

#### THE INFLUENCE OF PROTEIN FOOD ON INCREASED BLOOD PRESSURE; Herman O. Mosen-

thal, (Amer. Jour. of Med. Sc., Dec., 1920.) The author states that he has been led to make the studies, the results of which he presents in this article, (1) because of the popular opinion which exists among members of the medical profession that protein food has a definite influence on high blood pressure, that a diet high in proteins has been supposed to raise blood pressure, and vice versa, and (2) because of the indiscriminate application of this principle in any and all disease associated with hypertension by prescribing a diet low in proteins, especially in meats, for all patients exhibiting an increased arterial pressure. The author feels that the above ideas have been based on rather meagre evidence and that concrete evidence of carefully observed cases has been largely lacking. To furnish such concrete evidence he presents selected case reports of patients on whom, in the interest of accuracy, the following careful regime has been carried out:

(1) The patients were kept in bed for several days before the studies were begun in order to allow the arterial tension to assume the lower level which mental and physical relaxation bring about.

(2) The manometer readings were made at approximately the same time each day.

(3) The patients were kept in bed continuously and over a long period of time.

(4) The low protein diet as prescribed contained no meat, meat products or fish, while the high protein feeding contained large amounts of these same foods.

The cases as thus studied show:

(1) That neither a high nor a low protein diet have any remarkable effect upon the blood pressure in a few days.

(2) That there is no notable change in the level of the arterial pressure on a high or a restricted protein intake, while the total number of calories is maintained at a constant level.

(3) That the low protein diet is effective in pro-

ducing a diminution in the blood urea nitrogen, but the blood pressure remains unchanged.

(4) That a diet low in protein but with total caloric value increased results in no change in the arterial tension.

(5) That there is a tendency for a diminution of the blood pressure with a diet very low in protein and low in caloric value.

As a result of the above studies the author concludes:

(1) That it is exceptional for a low protein diet to diminish the blood pressure or a high protein diet to raise it, admitting, however, that this may occur.

(2) That the diminution of the waste products of the blood as indicated by a lowering of the blood urea nitrogen is without affect on the blood pressure.

(3) That changes in the caloric value of the diet for a short time at least does not influence the blood pressure.

L. S. YLVIKAKER.

#### DIAGNOSIS OF DISEASES OF THE PANCREAS WITH SPECIAL REFERENCE TO DIASTASE IN

THE URINE: R. L. Mackenzie Wallis, St. Bartholomew's Hospital, London. (Quart. Jour. Med., Oct., 1920.) The object of this paper is to apply various functional tests for pancreatic activity to a series of cases and then sum up the evidence obtained.

The difficulties of diagnosis of pancreatic disease, both by clinical features and functional tests, are recognized. The clinical features include the symptomatology of lumbar pain, tenderness, the occurrence of tumor with its consequent pressure effects, deep epigastric pains radiating to the right shoulder, emaciation, anemia, the occurrence of bulky stools and urinary changes are noted, with exploratory laparotomy as a last resort.

There are two kinds of tests for the functional activity of pancreas: 1st those depending upon the digestion of foodstuffs; 2nd those relating to internal secretion of pancreas as it effects Carbohydrate Metabolism.

I. The tests for digestive ferments are carried out in stomach contents or feces, and depend upon their diminution or absence.

- a. Azotorrhea.
- b. Steatorrhea.
- c. Diastase.
- d. Oil Test Breakfast (doubtful value).
- e. The Schmidt Test Diet.
- f. The Sajodin Test (test unreliable).

II. Tests depending upon other functions of pancreas.

- a. General character of the urine.
  1. Bile pigments.
  2. Indican.
  3. Calcium Oxalate.
  4. Absence of Ethereal Sulphates.
- b. Diastase content of the urine.
  - Marked increase in pancreatic disease.



The urine content follows closely that of the blood in absence of kidney pathology.

c. Cammidge reaction.

The author is of the opinion that the results are not commensurate with time required.

d. Loewi Test.

Believed to be of considerable importance.

e. Glucose Tolerance Test.

Of importance but other conditions such as disturbed liver function may give a positive test.

The author's "Tripod" are:

1. The diastase content of blood, and urine.
2. Loewi Test.
3. Glycosuria.

The transitory character of these tests are noted and the following conclusions derived at.

1. Value of functional tests.
2. No one test sufficient.
3. "Tripod."
4. Accessory—creatorrhea—steatorrhea.
5. Transitory character of these phenomena.
6. Investigation negative in Diabetes Mellitus.
7. Certain tests of no value (oil test meal, Sahli test, Cammidge, Sajodin test.)

THOMAS ALBERT PEPPARD.

## SURGERY

### SUPERVISORS:

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**THE DIAGNOSIS AND TREATMENT OF HYDROCEPHALUS RESULTING FROM STRICTURE OF THE AQUEDUCT OF SYLVIVS:** W. E. Dandy (Surg., Gynec. and Obst., 1920.) Hydrocephalus is always secondary to a primary cause which should be located in every instance, although its discovery, while at times simple, is usually difficult. The cases are divided into two groups: (1) communicating and (2) obstructive. Nearly all cases of hydrocephalus are due to an obstruction, but in the so-called obstructive group the obstruction is in some part of the ventricular system. In the communicating type, the ventricles are in communication with the subarachnoid space and the obstruction, usually adhesions, lies in the various parts of the subarachnoid space. The differential diagnosis is accomplished by injection of one cubic centimeter of indigo carmine into a lateral ventricle. If, on lumbar puncture, the dye appears in the spinal canal, there is communication between the ventricles and the subarachnoid space. This type is known as "communicating". The absence of the dye in the spinal fluid denotes an obstruction at some point in the ventricular system; this type is called "obstructive."

All the cases studied have essentially the same microscopic pathology. In each instance, only

epithelial remnants of the lining ependyma remain, and an hypertrophy of the glial tissue replaces the defect. Some of the author's cases showed occlusion of the entire length of the aqueduct of Sylvius. The presence of a meningocele should always create a suspicion of an accompanying hydrocephalus, although the cause of this not infrequent association is unknown.

An occlusion of the aqueduct of Sylvius can be localized accurately. It is first necessary to prove the existence of hydrocephalus, second to determine the type and finally, if obstructive, to locate the obstruction. The diagnosis and the degree of ventricular dilatation can be determined with absolute accuracy by ventriculography. When moderately advanced, not infrequently the condition can be recognized by x-ray without ventriculography. Careful weekly measurement of the head should always be made until any suspicion of hydrocephalus is allayed or verified.

The author proposes a new operation for the cure of hydrocephalus. A rubber catheter is introduced into a newly formed aqueduct. The tube is left in place for as long as possible, but usually will require a secondary operation for its removal. The object is to allow the formation of a new aqueduct. Two patients have been operated on, one of whom died, the tube remaining in place two weeks. The tube was in place in the other patient, who seems well one year after operation, for a period of three weeks.

In concluding the author calls attention to cicatricial stenosis as the most frequent lesion in congenital hydrocephalus. The stenosis may occupy part or the entire length of the canal.

J. A. BUCHANAN.

**CLINICAL CONSIDERATIONS OF OSTEOMYELITIS:** A. J. Ochsner, and D. W. Crile (Surg., Gynec., and Obst., 1920, 31, 263-276.) Osteomyelitis is an inflammatory disease of bone usually originating in the medulla. The staphylococcus, streptococcus, typhoid bacillus, and pneumococcus organisms are most often causative. This disease affects boys three times as often as girls and involves the femur and tibia in a large proportion of cases. Abscesses usually develop within twenty-four hours of the onset. Epiphysitis occurs in 12 to 15 per cent of the cases and between the second and seventh day.

Sequestration of the diseased medullary bone takes place in two weeks while the removal of cortical bone may require four to eight weeks. Repair of bone is carried on by bone elements left clinging to the periosteum and nourished by the vessels of the periosteum. The new involucrum is often of poor quality.

Symptoms in osteomyelitis are proportionate to the grade and severity of the process; thus, pain may be excruciating or entirely absent. The x-ray in the early stages is of little or no value except in a negative way.

Treatment consists in the earliest possible surgical drainage, splitting and reflection of the periosteum,

and free opening of the medullary cavity in the involved area. The marrow should be removed with a curette and the walls of the cavity washed with carbolic acid solution (5 per cent), Dakin's solution, or tincture of iodine. The cavity should be packed with iodoform or plain gauze, especially in the acute stage, to prevent the accumulation of a blood clot which may lead to continued suppuration. The wound should be left open. Amputation is not indicated even in the most desperate cases.

After-treatment consists in the removal of the gauze packing on the second or third day. If frank pus is present in the medullary cavity or has burrowed into the soft parts, rubber drainage tubes or Carrel's method of sterilization is instituted.

Success in the treatment of chronic osteomyelitis depends on (1) removal of absolutely all dead tissue and (2) provision for filling the remaining defect. This is accomplished by leaving the cavity empty and closing the wound by a double row of continuous catgut sutures, the first as tension and the second as coaptation sutures. A large dressing with several splints is applied for immobilization until the blood clot which develops is thoroughly organized. Failure to appreciate the importance of preventing any disturbance of the clot has been a factor in most of the bad results following the use of this method.

Recurrences are most often due to re-infection from foci overlooked at the primary operation. Infected teeth and tonsils, trauma, excessive carbohydrate consumption, cold, and exposure are other factors in recurrence.

A. C. JOHNSON.

#### THE RESULTS OF OPERATIONS FOR INGUINAL HERNIA PERFORMED IN THE JOHNS HOPKINS HOSPITAL FROM JANUARY 1, 1899 TO JANUARY 1, 1918: Adrian S. Taylor (Arch. Surg., 1920, 382-406.)

The author reviews the work and observations of Halsted and Bloodgood with regard to inguinal hernia, and directs attention to the original technic and subsequent modifications. From January 1, 1899, to January 1, 1918, 256 operations for direct, and 2,230 operations for indirect inguinal hernia have been performed in the Johns Hopkins Hospital. The results of operation were ascertained by examination or by letter from the patient or his physician in 816 cases. There were thirty recurrences in 356 patients with indirect hernia examined at the hospital while only sixteen recurrences were noted in 460 patients who reported by letter. It is probable that the actual number of recurrences is greater than the figures indicate, because the patients evidently easily overlook the condition. In 770 patients who were cured six years have elapsed since the time of operation, and the average time after operation in forty-six recurrent cases was forty-two months. Seventy-seven of the 256 patients operated on for direct inguinal hernia were heard from; seventeen of these had recurrences on an average of 8.6 months after operation.

In determining the factors in recurrence, it was noted that when excision of veins was practiced in cases of indirect hernia hydrocele occurred in 20 per cent of cases, as against 3.8 per cent without excision. In the direct type non-excision carried only a 2.2 per cent recurrence as against 77.7 per cent in patients treated by excision. When local anesthesia was used the recurrences were 12 per cent in the indirect and 18.1 per cent in the direct type.

In forty-eight cases of indirect hernia with obliterated conjoined tendon eighteen recurrences (37.5 per cent) were found as against six (31.5 per cent) of nineteen cases of direct hernia. Infection of the wound caused a 25 per cent recurrence in the indirect, and a 50 per cent recurrence in the direct hernia.

When the rectus muscle was transplanted for indirect hernia, recurrences were present in nine of twenty-two (40.9 per cent), while the same procedure employed with the direct herniation gave only a 25 per cent unfavorable result. By transplanting a flap from the rectus fascia a 100 per cent cure was obtained in thirteen cases of indirect hernia. This method was used in three cases of direct hernia with one recurrence. In nineteen cases of cord transplantation in indirect hernia, seven recurrences (36.8 per cent) were present, three were found at the site of the transplanted cord, while a 25 per cent recurrence was found in the direct hernia.

The cord was split and the veins alone transplanted in forty-four cases of indirect hernia; the percentage of recurrence was 18.1 per cent, while in three cases of direct hernia no return occurred.

Excision of the cord was practiced successfully without recurrence in twenty-five cases, four of these being direct.

Mortality rates in 2,486 operations since 1899 show nineteen deaths in the hospital, seven due to strangulated hernia, four to pulmonary embolism, one to myocarditis, two to meningitis, four to pneumonia, and one to status lymphaticus in an infant of seventeen months. The total mortality was 0.76 per cent or with exclusion of deaths by strangulation, 0.48 per cent.

A brief outline of the operative technic devised by Halsted is given. The important features of this are high ligation of the sac, perfect hemostasis, and suture of the cremasteric muscle to the under surface of the internal oblique muscle. The cord is not disturbed. The edges of the conjoined tendon and internal oblique muscle are sutured to Poupart's ligament, and the flaps of the external oblique muscle are overlapped. Halsted's method of using a flap from the anterior sheath of the rectus fascia in the case of a narrow or thinned, conjoined tendon is shown. Transplanting the cord is, as yet, an unsettled problem, but, as now practiced, appears to increase the possibility of recurrence.

The author calls attention to the use of the cremaster muscle in obtaining a solid closure. In all cases of recurrent hernia the overlapping of the ex-



ternal oblique aponeurosis is permanent, while the free edge of the internal oblique muscle does not always remain permanently attached to Poupart's ligament, and may, therefore, undergo fibrous change.

A. C. JOHNSON.

**ESOPHAGEAL DIVERTICULA:** E. S. Judd (Arch. Surg., July, 1920.) Diverticulum of the esophagus is a comparatively rare condition, although more common than indicated by the approximately 200 operative cases reported. Fifty-four patients with esophageal diverticula have been operated on at the Mayo Clinic. The two common types of the condition are the pressure and the traction diverticula. The latter commonly occurs in the thoracic part of the esophagus, and can often be shown to be formed by the pulling out of the walls of the esophagus by some inflammatory adhesion. These traction diverticula include all the layers of the esophagus, are usually multiple, and seldom attain any appreciable size, or produce symptoms. Occasionally the sac enlarges because of pressure from inside and a traction-pressure diverticulum is produced. This condition, it is estimated, occurs in about 7 per cent of traction diverticula.

The pressure diverticulum was first described by Zenker and Ziemssen and always occurs at a point behind the cricoid cartilage on the posterior wall of the esophagus. The arrangement of the musculature here results in a weakness in the wall of the esophagus and, through pressure in swallowing, the inner coats of the esophagus may be forced through a chink on the outer coats, and thus a simple pouch is formed. When the intra-esophageal pressure is increased, the pouch tends to increase until it becomes large enough to hold accumulated food and mucus from the esophagus. The sac of an esophageal diverticulum contains only the mucus membrane and submucosa, thus differing from diverticula in the sigmoid and other parts of the intestine. No clue to the etiology, other than a weakness in the wall of the upper end of the esophagus, could be found in the author's cases.

The symptoms are usually proportional to the size of the sac. The pressure may cause an almost complete stenosis of the lumen of the esophagus. The average age of the patients at the time of operation was 55; the symptoms rarely occurred before 45.

At the present time roentgen ray and esophagoscopy examinations are used in diagnosis, and an accurate diagnosis can be made by either one or both of these methods. In suspected cases the roentgenologic examination is made after the patient has swallowed a bismuth mixture. An esophagoscopy examination is then made to rule out the possibility of any other lesions, such as carcinoma. Dilatations of the esophagus must also be excluded; these are usually caused by spasm of the cardia or stricture of the esophagus due to scar. In one of the author's cases a congenital diaphragm was the cause of the dilatation.

The treatment of esophageal diverticula is surgical. Dilatation of the esophagus, repeated at intervals, may keep the patients fairly comfortable; but in most cases the sac increases in size, restricts the food intake, and eventually produces emaciation. On this account some patients require forced feeding before any treatment can be undertaken.

One of three types of operation may be employed. The first method is applicable when the sac is small. The sac is dissected from its bed. The neck of the sac is completely freed from the surrounding tissues and purse string and plicating stitches are placed so that when it is tucked into the esophagus and the stitches tightened, it will be held permanently in the lumen of the esophagus, where it atrophies or possibly sloughs off.

The second method is the complete excision of the sac and suture in one stage. Occasionally there is leakage from the suture line before the pocket has become lined with a granulation barrier and in some instances the result is serious.

The third method is a two stage operation. In the first stage the sac is freed in the usual manner and the mucous membrane dissected 1 to 2 cm. from the musculature of the esophagus. At this point the neck of the sac is caught to the sternomastoid or platysma muscle with a few interrupted catgut sutures; the wound in the neck is closed around the neck of the sac, and the whole sac allowed to prolapse from the wound. Neither the esophagus nor the diverticular sac is open so that the surrounding tissues and spaces are not exposed to infection. Moreover, as the deformity in the esophagus is corrected, the patient can swallow without difficulty. At the end of 10 or 12 days there is a complete barrier of granulation tissue separating the pocket in the neck from the mediastinum. The neck of the sac is again freed and the sac excised; the opening in the esophagus and the wound in the neck are closed. No anesthesia of any kind is used in this stage, although in some instances it may be well to inject the neck of the sac with procain before excising it. If a small fistula forms, it always heals completely within a short time.

The author believes the two stage operation should be employed in nearly all instances, as it is safer. The inconvenience to the patient and the time and suffering are less than they would be if complete excision were performed in a one stage operation. If infection follows the one stage operation, it results fatally in many cases. Three deaths occurred in fifty-four cases, two following a one stage operation and the third following the first stage of a two stage operation. The ultimate functional results have been very satisfactory and in no instance has a stricture developed.

J. E. MCCORVIE.

**A REVIEW OF EIGHT YEAR'S EXPERIENCE WITH BRAIN TUMORS:** E. Sachs (Arch. Surg., 1920, I, 74-84.) In the author's series of eighty-five

cases of brain tumors, there were twenty-nine deaths or a mortality of 35.5 per cent. The largest mortality occurred in patients with gliomas of which there were eighteen. Tumors other than glioma were found in sixty-four patients, or about 74 per cent. Among these the mortality was only 17 per cent.

Some gliomas grow by replacing tissue and others by displacing tissue. The former do not give rise to any general symptoms of increased pressure, but produce signs of focal phenomena, irritative, or paralytic in character. A diagnosis of brain tumor may, therefore, be made, although no general signs of pressure are present. Gliomas should not be regarded as malignant tumors since they do not metastasize.

Early operation in cases of brain tumor is essential. The only successful extirpations of gliomas were in patients whose symptoms were present four months, or less. The practice of dilatory and palliative measures over months of time is absolutely wrong and unjustifiable. Every brain tumor should be treated on the basis that it may be a glioma, requiring immediate surgical treatment.

In twenty-six per cent of the author's cases the glioma was readily removable, although successful extirpations constituted but 14 per cent.

The type of operation apparently has no bearing on the mortality. The brain in which glioma occurs shows marked deformity, which should be decreased rather than increased by operation. This may be accomplished by removing the growth in several stages. Thus, in eighty-five cases 106 operations were performed.

A preliminary decompression and withdrawal of fluid by ventricular, not lumbar, puncture should be done to reduce the intracranial pressure to normal before the dura is opened. In 100 ventricular punctures no harm has resulted from the procedure.

In sixty-four non-malignant cases diagnosed pre-operatively as brain tumor eleven patients died, a mortality of 17 per cent. Twelve of the patients had cysts of various types, two of which were gliomas while a third was a huge cyst replacing the vermis. Cysts may occur as a result of tentorial hemorrhage from which the patient has recovered. In two other instances there were huge porencephalic cavities. One patient revealed multiple cysts of the taenia solium.

Palliative measures often afford a surprising amount of relief, especially in cases of impending blindness and severe headache.

A. C. JOHNSON.

**POST-OPERATIVE TREATMENT OF FISTULA-IN-ANO: WITH SPECIAL REFERENCE TO THE USE OF GUTTA PERCHA TISSUE:** Alfred J. Zobel (Minutes Amer. Proct. Soc., April, 1920). The writer quoted that the essential difference between the general surgeon and the surgical specialist is the careful attention to detail which the latter gives to everything within the scope of his particular field of endeavor.

Watching the work of some of the better general surgeons, he has been struck by the fact, that in their rectal work, the operation itself seemed to be the only thing of importance. The post-operative treatment, particularly, appeared to be of very little consequence to them, and was often left entirely to the interne or the nurse; this accounts for a great part of the large percentage of failures which follow fistula operation as shown by hospital statistics.

The writer described his way of treating fistula cases, following operation. The wounds are first lightly, yet firmly, packed with strips of iodoform gauze which has been thoroughly vaselined, which are left in for 24 hours only. After this, strips of gutta percha tissue alone are used, over which moist boric acid compresses are applied frequently, then oiled-silk, then a dry outside pad, and the dressing is complete. Reasons for using the vaselined gauze, and the hot moist compresses, are given.

The writer further stated that the gutta percha tissue dressing allows free drainage along the sides; easily keeps the skin edges separated; does not press upon, nor injure in any way delicate granulations; does not retard healing; does not cling to raw surfaces; is easily replaced by the nurse, without fear of doing damage, should it come away when the dressings are renewed; and, most important, is removed without causing pain.

**GALLBLADDER DISEASE. A STATISTICAL STUDY:** Conrad Jacobson (Arch. Surg., 1920, 310-335). A statistical study of a series of 470 cases of gallbladder disease admitted to the surgical service of the Peter Bent Brigham Hospital during a period of six years forms the subject of this paper.

The author states that next to appendicitis gallbladder disease is probably the commonest intra-abdominal lesion, forming in this series about 4.2 per cent of a total of 9,484 operations for all conditions. Gallbladder disease, choecystitis and cholelithiasis, is a disease of middle age occurring with special frequency in women and closely associated with the increasing incidence of pregnancy; the greatest frequency in this series was between 40 and 50 years of age. Many cases evidently originate in early age and persist with only vague indefinite symptoms until later in life.

Gallstones are due in all probability to a hematogenous infection, commonly streptococcal, of the gallbladder and biliary passages, and are associated with an altered cholesterolin content of the blood.

Symptomatically the author divides this series into four groups: (1) The typical biliary group in which a history of definite biliary colic due to the passage of the stone down the biliary passages is given; this comprises over half of the total number. (2) About 17 per cent are of the atypical biliary group in which the chief symptom is dull pain over the upper right quadrant associated with tenderness, fever, and nausea and vomiting. (3) The gastric group comprised 14 per cent; the symptoms, epigastric distress,



fullness after meals, and belching of gas, were referable to the stomach. (4) The biliary gastric group presented gastric symptoms and recurring colics.

No definite assistance in diagnosis was obtained from the analysis of the gastric contents in this series. A positive diagnosis of gallstones was made in 27.5 per cent of the cases by roentgenologic examination, the findings being confirmed at operation.

Complications of the common-duct and pancreas are of frequent occurrence in the long persisting cases. There appears to be no special dilatation of the extra-hepatic biliary passages in the slow obliteration of the gallbladder through chronic infective processes with fibrosis; but after cholecystectomy there appears to be some dilatation at or above the junction of the hepatic and common ducts.

Perforation of the gallbladder was found in six cases; a normal gallbladder was removed in sixteen instances. Recurrences are due mainly to overlooked or re-formed stones and persistence of the original infection or its extension as a chronic pancreatitis. Injury to the biliary passages during operation is due to the rather frequent abnormalities in the blood vessels and biliary passages.

Cholecystectomy is the operation of choice in cholecystitis and cholelithiasis, whenever feasible. There is marked beneficial effect in long continued drainage of the biliary passages in the complicated cases of cholecystitis and pancreatitis. So far as can be ascertained removal of the gallbladder has no special effect on the body economy.

The mortality for the whole series was 6.5 per cent. The author shows that there is an increasing mortality rate with the increase in the complications and urges an early recognition of and early operation for gallbladder disease.

FRED R. SANDERSON.

**OBSERVATIONS ON THE BLOOD PRESSURE IN CASES OF PROSTATIC OBSTRUCTION:** V. J. O'Connor (Arch. Surg., Sept., 1920) has made a study of blood pressure changes occurring during the drainage period of patients with prostatic obstruction.

Complete drainage of the bladder in patients with marked urinary retention, either by an indwelling urethral catheter or by suprapubic cystotomy, is followed by a fall in blood pressure. This decrease in the blood pressure is most marked in patients with hypertension and a large amount of the residual urine. The extent of the drop seems to depend on the amount of the residual urine and the degree of reduction of renal function.

There was no difference in the degree of blood pressure change in patients drained by suprapubic cystotomy and those in whom a urethral catheter was used. The greatest drop in blood pressure was noticed during the first 24 hours. In 60 per cent of the cases the systolic blood pressure continued to

fall during the second twenty-four hours in 40 per cent no further reduction occurred; and in 85 per cent no decrease in the diastolic blood pressure took place during this period.

Patients operated on at a time when their blood pressure was still decreasing often showed a marked postoperative fall in blood pressure.

Patients whose bladders are adequately drained will eventually reach a stage at which the blood pressure is maintained at a definite, non-fluctuating level. During this period the adequate renal function and satisfactory general condition indicate that the patient is in the best possible condition for operation. This level or equilibrium of blood pressure is generally reached after about two weeks of bladder drainage and in most cases is lower than before drainage.

In a number of patients who were examined several months after operation it was found that the blood pressure has remained at a level which shows an average decrease of from 65 to 10 mm. of mercury.

A. J. SCHOLL, JR.

#### **RIB GRAFTING OPERATIONS FOR THE REPAIR OF BONE DEFECTS AND THEIR END-RESULTS AT LETTERMAN GENERAL HOSPITAL:**

L. Eloesser, (Arch. Surg., 1920, 72, 428.) In bone-grafting operations, the author selects the ribs as furnishing the best material for bone transplants. It was believed that a thin, highly viable, vascular graft, with soft cortex and a large amount of cancellous tissue produces better results than a bone with thick, dense cortex and little or no cancellous tissue. Absorption of osseous tissue and deposits of permanent bone take place more rapidly in such a graft, thus permitting an earlier return of function to the limb.

Gallie states that the processes of absorption outstrip those of replacement and therefore cancellous bone, such as rib, should not be used when the graft is to be placed under strain or when the gap to be bridged is wide and rapid absorption is not desired.

The author's series seems to show that the very tardiness with which massive grafts are absorbed is a distinct advantage inasmuch as a thin, frail graft may be absorbed before the osteoblasts are prepared to lay their bony deposits on it.

The practical advantages of the rib graft consist in the unlimited supply, its easy accessibility, its comparative tubular strength its viability, and the short postoperative stay in bed.

The technic of rib-grafting is not difficult being essentially the same as for any other graft. The front part of the fifth or sixth ribs is usually selected, as it is straightest. The rib is removed with its periosteum without opening the pleura, which although not dangerous, is best avoided. The rib is carefully dissected away from the muscles and pleura for one or two inches; it can then be snipped off by a curved rib shears. The cut end is retracted outwards and the intercostal muscular attachment

dissected as far back as necessary. A hole is then drilled through each end of the excised rib and the graft split longitudinally with an osteotome or stout knife. Kangaroo tendons are threaded through the holes in the graft and through the previously drilled holes in the ends of the fractures; they are then threaded around the entire bone with a ligature carrier tied securely. The split portions of the graft form a trough in which lie the ends of the fractured bone. The periosteum is sutured, the soft parts brought together, the skin closed, and the extremity encased in plaster.

Variations in the application of the graft to different types of cases will readily suggest themselves. Fixation should be used for from ten to twelve weeks as Gallie has shown that two months is the average time at which absorption is complete.

In reporting his end-results, the author considers those operations successful in which firm union has taken place according to both x-ray and clinical evidence. The series includes twenty-two cases. Operations on seven of ten patients with radial defects were successes and three were partial failures. One ulnar defect, partially successful, refractured at operation. There were five patients with defects of both radius and ulna, on partial and four complete successes. All operations for humeral defects were failures. One defect of the tibia and jaw each was successfully repaired. Eleven patients had more or less suppuration following operation. Refracture occurred in seven, or almost one-third of the twenty-two cases. The bone graft always broke in the middle, the end being united to the matrix bone.

The author concludes that rib-grafting is a feasible procedure and the graft survives very well even in the presence of suppuration. The grafts absorb rapidly and hypertrophy slowly. They are inferior to tibial grafts in the repair of large defects and in the ability to bear strain. Of twenty-two cases, three were failures, thirteen were successes, and six were partial successes.

A. C. JOHNSON

**SPERMATOCELE:** E. T. Crossan (Ann. Surg., 1920, 72, 500). Spermatocele was found in approximately 8 per cent of testicles in two series of cadavers examined. The cyst originates in the scrotum and is or has been connected with the semen-carrying system. Spermatocele may be confused with ecysted hydrocele.

In order to appreciate the condition its origin must be sought in the anatomy and embryology of the region. Structurally the cyst wall contains smooth muscle fibres from the vasa efferentia. The epithelial lining may be columnar, ciliated, or pavement in type.

Extra-vaginal cysts are usually unilocular and often pear-shaped, displacing the testicle downwards and forwards. Their origin may be the superior vas aberrans or vas efferentia. Others, primarily extra-vaginal but less common, arise from the vas deferens

and paradidymis. The intra-vaginal type of cyst springs from the sessile hydatid or canal of the epididymis. These take the shape of the globus major, are thin walled, and often rupture into a hydrocele.

The contents of a spermatocele may serve as a basis to distinguish it from a hydrocele. The fluid in the former is more feebly alkaline, of lower specific gravity, and contains much less albumin than that in the latter.

Spermatoceles are almost exclusively caused by trauma, usually of a tearing character. A history of trauma to a functioning testicle, slow increase in size, pain, and the presence of a tumor of either type above described, are reasonable indications of spermatocele. A further aid in diagnosis is the symptom of swelling on sexual excitation.

Cure is accomplished by radical procedures. In cysts arising from the sessile hydatid and the vas efferentia a portion of the tunica albuginea must be removed and the defect covered by serosa. In other varieties enucleation with ligation of the stalk may suffice.

J. W. ROSS.

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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**TYPES OF PELVIC INFECTION:** Doederlein (Surg. Gyn. & Ob., June, 1920). This interesting and thoughtful study classifies pelvic infections as follows: (A) Ascending through continuity, blood or lymph vessels and includes; (1) Puerperal, and (2) Gonorrhoeal.

(B) Descending, either by continuity from local infection, appendicitis, or blood—born as tuberculosis.

Puerperal sepsis accounts for from 30 to 35% of maternal mortality, is a wound infection and 90% of the cases are due to avoidable causes. The surgeon sees only the severe cases but there are a large number of milder ones causing chronic invalidism. In the young the vagina is steril and the common bacterial flora, including varieties of staphylococcus is innocuous. The normal secretions are bactericidal and are most active in the region of the cervix. This defense is broken down by removal of, or interference with, the normal flora and secretions, by: douches, strong anti-septics, alkaline leucorrhoea, cervical erosions, or menstruation. Puerperal sepsis is carried to the pyometrium by the lymphatics and is usually retroperitoneal. The author refers to the work of Mortiz who demonstrated a definite arrangement of the fibromuscular tissue about the cervix and lower uterine segment. This is the region primarily involved and explains the brawny pericervical inflam-



ation. Bacteriology of pelvic infection is of little value as indication for treatment. He emphasizes the danger of premature operation and accepts Simpsons well known conclusions relative to indications for operation. Operative experience demonstrates that highly virulent bacterial may become encysted and retain activity for years. Late operation on encysted foci are often more dangerous than a judiciously timed earlier one. In spite of dense adhesions the quiescent organs may function undisturbed, unlike the effects of Gonorrhoea.

As regards Gonorrhoea, infection of the vulva and vagina is most active in children while in adults it is a menace to others rather than to the patient. Ascent of the process is favored by; menstruation, labor, coitus, examination, or meddlesome therapy. Mild infection of the tubes may permit of conception and become active after labor, resulting in sterility. Involvement of the tubes and ovaries rarely threaten life, but usually destroy these structures. Operations after the acute stage are relatively safe as compared to the puerperal type of infection.

Early treatment of the acute stage of either type includes rest in bed, icebag, opium and no meddlesome measures. The more active the process, the greater is the contra-indication to aggressive local measures.

(B) Descending infection carried by continuity of the peritoneum, or through the blood stream include: 1. Colon bacillus infection from the rectum with parametritis. 2. Appendicitis with tubal or peritubal involvement. Operative procedures with this form are comparatively safe. 3. A definite type of nonpuerperal abscess involving the ruptured follicle and corpus luteum. 4. Pelvic tuberculosis which is usually blood-born.

Concludes that: 1. Classification of ascending and descending types of pelvic infection is of value in prognosis. 2. Operations for the descending form do not present grave danger. 3. In the ascending infections differential diagnosis between puerperal or gonorrhoeal forms will determine the risk of operation.

**THE VALUE OF ROENTGENOGRAPHY IN OBSTETRICS:** (Under this caption a series of articles appearing in foreign medical literature have been abstracted in Vol. 1, No. 3 of the Amer. Jour. of Ob. and Gyn.) Warnekros states that advance in technic has made it possible to procure exact pictures of the fetus in utero by means of exposures of eight to nine tenths of a second. By means of a series of pictures of the same patient during pregnancy and during labor he was able to obtain "by direct observation" information concerning the attitude of the fetus during pregnancy and concerning the mechanism of labor. Where such observations do not harmonize with older views and theories, the latter must now be discarded as positively disproved. In the ab-

sence of disturbing factors, the fetal head is held in a comfortable middle flexion; the fetal vertebral column in its convexity only conforms to the shape of the uterus; there is no force or even typical attitude of the extremities; position depends solely upon available space. The above holds true for both head and breech presentations. Any deviation of this natural attitude suggests some anomaly.

Under normal conditions the head enters the pelvis without further increase in flexion; the latter occurs about the time of internal rotation and is the result of the transmission of pressure from the fundus by way of the vertebral column pushing the occiput deeper down. Internal rotation is brought about under the influence of the pelvis floor muscles. At the moment that the head is born the shoulders, contrary to common opinion, stand transversely in their normal relation to the head. There is no torsion.

Regarding the third stage of labor he concludes: The placenta, as a rule, separates first at the edge and with but few exceptions reaches the internal os edgewise and in this position glides into the vagina. In the vagina the change takes which causes it to appear by its fetal surface, known as the Schultze method. The placenta does not separate until the fetus is expelled from the uterus but it becomes detached immediately the uterus retracts over the escaping fetus as in all his pictures, though taken within five minutes, the placenta appeared wholly detached. The use of anaesthesia does not seem to alter the above.

In breech presentation as in head, the fetus assumes a comfortable attitude and the pressure of the fundus is transmitted along the vertebral column. A series of roentgenograms taken in two cases shows distinctly the spontaneous change, during the first stage of labor, of a breech presentation into a normal head. Clinical observation has always considered such a change possible but these observations offer unimpeachable proof.

Weibel agrees with Warnekros as to the time and manner of placental separation; that the actual mode of expulsion of the placenta from the vulva has no relation to the mechanism of its detachment, its final appearance being due to changes taking place in the vagina and that the terms "Schultze" and "Duncan" must disappear from obstetric nomenclature.

Vogt suggests that roentgenograms of lungs and the intestinal tract will aid in the differential diagnosis between cases of extrauterine life and those of stillbirth.

Hess suggests that the extent of ossification as revealed by the roentgenogram, rather than the older methods of measurements, will determine the age of the fetus. This test can be used when only parts of the corpse are available.

ALBERT G. SCHULZE.

## ROENTGENOLOGY

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**TRAUMATIC PNEUMOCRANIUM:** Alfred S. Doyle, (Am. Jr. Roent. Feb., 1921, P. 73.) The subject of traumatic pneumocranium is interesting inasmuch as only a few cases of this condition appear to have found their way into medical literature within the last decade. Cases have been reported by Stewart, Holmes, Skinner, Kuckett, and one not reported by Walter Dodd. In January, 1919, Dr. Hollis E. Patter published a case which up to the present time seems to be the only one on record in which the patient appears to have made a recovery either with or without surgical intervention.

The author's case was struck by an automobile June 7, 1919. The injury resulted in lacerations of the scalp in the left supraorbital region. The patient's symptoms gradually became worse. He was first referred for roentgen examination in September, 1919. This demonstrated a depressed fracture of the cranium in the left frontal and temporal region. In addition a large air cavity was found. Operation performed September 24, 1919, showed that the air was enclosed under pressure. The patient died the following day and subsequent autopsy showed that there was free passage from the air cavity, through the ethmoid sinuses into the nasal cavity. The thick mucous found in the passage probably acted as a valve in admitting and confining the air.

The unusual features of this case were: (1) The length of time the patient lived with gradually increasing air cavity into which air constantly gained admission from the ethmoid cells and could not escape. (2) The condition was not suspected.

R. G. ALLISON.

**ROENTGENOLOGICAL ASPECTS OF LOWER RIGHT QUADRANT LESIONS:** F. H. Baetjer and J. Friedenwald. (Am. Jour. Med. Scs. Nov. 1920.) The diagnosis of lower right quadrant lesions is a matter of great importance; not only is this because of frequent occurrence of appendicitis, but because of the lesions which are apt to present themselves in this region, the differential diagnosis of which is often fraught with much difficulty. Observations are to be made by means of the bismuth meal observed at varying intervals, and also by means of the bismuth enema.

1. Appendicitis: Case emphasizes two points: 1. The necessity of examining the patient in a horizontal position with the screen over the abdomen and the tube underneath the table. 2. The necessity of palpating the abdomen and noting the localized

tenderness. When the appendix remains visible over more than a day or two after the bismuth examination, it is in proportion to its poor drainage, a dangerous appendix. When the appendix is retrocecal the caecum must be pushed aside to visualize the appendix. A great majority of these retrocecal appendices show tenderness upon direct palpation. In those cases in which there is no tenderness appendicitis may usually be excluded, but if the caecum is adherent there is always a possibility that this is due to some inflammation in the appendix in the past even if the appendix is visualized and not tender. Phaffler claims that if there is localized tenderness over a fixed caecum even if the appendix is not visualized it means a pathological appendix.

The writers, however, do not believe every visualized appendix is necessarily pathologic. On the other hand when we find an appendix filled with bismuth, curled up and fixed this invariably means some pathologic process is present. The writer's experience agrees with Phaffler's in the kinking of the appendix which remains constant, is a significant sign of adhesions; and when the appendix constantly points upward towards the gall bladder region there is good ground to believe it to be in a pathologic state.

When the pyloric end of the stomach is observed lying down on the lower right quadrant region, whether due to the omentum wandering toward the inflammatory process or from actual adhesions from the appendix extending into the omentum, it is a very definite indication of a pathologic appendix.

The appendix may be markedly diseased without being visible, due to an obliterated process. In cases of sub acute appendicitis on account of the inflamed state of the appendix, the meal frequently will not enter and there may be no adhesions. The only sign that can be elicited will be tenderness over the appendix region.

2. Incompetent ileocecal valve and ileal stasis; This condition shows the following phenonema: 1. When the bismuth is given by mouth we find an actual regurgitation of the bismuth from the caecum back into the ileum. 2. In giving a bismuth enema at low pressure the bismuth passes into the ileum.

3. Dilation of the caecum with retention; This condition shows retention in the caecum of the bismuth meal for more than 48 hours. The patient may not complain of constipation. The bismuth will become almost adherent in masses to the sides of the caecum and allow only a small channel in the center. This must of necessity cause a low grade inflammation of the caecum which will frequently extend to the appendix.

4. Tuberculosis ulcerations; The presence of intestinal hypermotility spasm and filling defects give according to Brown and Sampson in a patient with pulmonary tuberculosis almost definite evidence of colonic tuberculosis.

5. Adhesions and angulations; These conditions are usually readily recognized by means of the roentgen rays. Not only the caecum and descending



colon but also the terminal portion of the ileum is a common seat for adhesions.

6. Ulcerations due to carcinoma; In this condition there is a definite filling defect in the caecum due to carcinoma. This defect is large, serrated and constant in all the plates. In addition on fluoroscopic examination there is localized tenderness and fixation.

R. G. ALLISON.

#### OSTITIS TUBERCULOSA MULTIPLEX CYSTICA:

Otto Jungling; (Forts auf dem Gebiete der Roent, Sept. 30, 1920.) The writer describes a case which came under observation in 1911, and later came under observation again in 1917. The patient was a boy 16 years old, whose mother had pulmonary and intestinal tuberculosis. The patient had had in his childhood a marked and chronic inflammation of the eyes. At the time of first examination there were definite signs of a healed pulmonary tuberculosis. Present illness: without special cause and without special pain, all of the fingers and toes had become swollen within a period of half a year. The degree of swelling varied, marked swelling being associated with redness and pain. In addition to the swelling there was a dilatation of the dorsal veins of the hands. Two fingers showed nobby swelling of the soft tissues suggestive of tuberculosis. The function of the joints was limited only by the swelling in the soft tissues. There was no contracture formation.

Subsequent observation in 1917 showed that the condition had spontaneously altered itself in the course of several years. There was a marked retrogression which had taken place slowly, interrupted by periods of aggravation.

Comparison of the roentgenograms of 1911 and 1917 show two entirely different pictures which they termed respectively types 1 and 2.

Type 1:—The changes in type 1 involve the greatest part of the bone or the entire bone of most of the bones of the hands as well as the phalanges and metatarsals of the feet. In the marked changes the original structure of the bone is no longer apparent. The phalanx is plump, the whole bone shows a honey-combed structure. The compacta has disappeared to a thin bony shell, and even this shows a breaking thru in several places. In the metaphyses and epiphyses are the largest blister like swellings. These give the impression of the confluence of small cysts thru the disappearance of the cyst wall. The bones show a slight swelling. The joint lines are smooth and intact. At no place is there a periosteal proliferation with the exception of callus formation at the site of one spontaneous fracture.

Type 2:—The phalanges have their normal form. The diaphyses show generally no change. The compacta is definite and even seems to be somewhat thickened. The metaphyses and epiphyses are markedly swollen. These show in their centers clear areas which are round, oval or heart shaped and vary in size from a linseed to a cherry stone. These clear

spaces appear like defects made with a punch chisel. The joint spaces are sharp and intact. No periosteal proliferation. Many bones show a complete restitution to integrity.

Subsequently the writers had the opportunity to study three similar cases. These cases showed changes of types 1 and 2 and all transitional stages between them. The pathological process was in one case not limited to the bones of the extremities. Otherwise the roentgenological picture was identical.

This pathological process begins in the central part of the bones of the hands and feet, breaks thru the compacta and in this way invades the subcutaneous tissues and under certain conditions can break thru the skin. The primary process is in the bone. In Lupus pernio, which this process somewhat resembles, the primary process is in the skin with secondary changes in the bone.

Consideration of the four cases showed definitely that they were dealing with a tuberculous process, the primary focus being in the bones. The writer coined the name "Ostitis tuberculosa multiplex cystica" for this pathological process.

This condition is distinct from Spina ventosa which shows diffuse swelling of the marrow part of the bone, frequent sequestra formation, periosteal proliferation, and fistula formation.

This process can roentgenologically be differentiated from Ostitis fibrosa generalisata only with difficulty. Ostitis fibrosa forms solitary cysts without choice in the diaphysis, metaphysis or epiphysis. Type 2 Ostitis tuberculosa locates in the metaphysis or epiphysis only, and in type 1, where the diaphysis is involved, it is identified by its generalized honey-combed appearance.

Other bony cystic processes on the basis of parasitic infections or malignant tumors can be easily differentiated.

The prognosis in these cases depends upon the extent of tuberculosis in other organs. This particular process is chronic but tends to spontaneous retrogression. The treatment should be the same as that for other forms of tuberculosis.

R. G. ALLISON.

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## PEDIATRICS

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TETANY AND THE ADMINISTRATION OF ALKALIS: P. S. Henderson (Quart. Jour. of Med., July, 1920). Previous writers notably Wilson, Stearns and Janney, A. H. Howland and Marriott have reported that the administration of sodium bicarbonate is sometimes followed by a manifest tetany. Henderson's material consisted of 19 infants and young chil-

dren, nine were aged less than 18 months. Most of them were suffering with acute or subacute infections. The amount of sodium bicarbonate administered equaled that given by Howland and Marriott, and ranged from .12 grams to .92 grams per kilo per 12 hours. It was usually given over several days, in some cases as long as 23 days. The Chvostek facial phenomenon was never produced, the electrical reactions were not affected, and the clinical tetany did not occur. The author concludes that this investigation lends no support to the idea that symptoms of tetany may result from the administration of large quantities of alkali.

ROOD TAYLER.

**THE DIAGNOSIS AND PROGNOSIS OF TUBERCULOSIS IN INFANCY:** Charles Hunter Dunn and Samuel A. Cohen, (*Amer. Jour. Dis. of Child.*, Feb., 1921.) In this paper Dunn and Cohen present new and interesting data on an old and very important subject. The correlation of clinical and necropsy findings on a large series of cases brings out some facts regarding tuberculosis in the first two years of life which have been hitherto, but little recognized.

In studying these cases Hamburgerer's classification of the disease into three stages was as follows: the primary stage representing the original lesion and the associated lymph node involvement; the secondary stage all the lesions produced by the further invasion of the body by the tubercule bacillus, and the tertiary all of the chronic destructive lesions of later life.

From a study of hospital records it appeared that formerly the diagnosis had been chiefly in the secondary stage when lesions such as bronchopneumonia, meningitis and pleurisy had presented themselves, and the necropsy had frequently demonstrated definite primary lesions in cases which had not been considered tuberculous.

The cases studied in this series were examined for signs of consolidation, and tracheobronchial lymph node enlargement including interscapular dullness, extension downward of normal cervical dullness and D'Espine's sign. Von Pirquet tests were made and repeated, and in every suspicious case roentgenograms of the chest were made.

From these studies, the subsequent necropsy findings in 138 cases, and a follow up system on patients who had been discharged, it appeared that when one of these signs was found a diagnosis of primary tuberculosis could be safely made. Positive or even doubtful VonPirquets indicate tuberculosis almost invariably; interscapular dullness and a positive D'Espine were found to indicate the disease in a large majority of cases (unless masked by consolidation in the lungs); and roentgenograms showing tracheobronchial lymph node enlargement were of great diagnostic value. Negative findings in any of the above did not exclude the disease. It is of interest to note that physical findings of consolidation

were not as conclusive as might be desired, since unresolved nontuberculous bronchopneumonias gave a similar picture. Roentgenograms, however, usually distinguished one from the other. Military tuberculosis unless conglomerate tubercles had formed, was usually missed on roentgen examinations.

Tables are given showing that primary tuberculosis can be diagnosed with a reasonable degree of certainty in the presence of a positive VonPirquet, or a roentgenogram showing tracheobronchial lymph node enlargement—the physical signs of the latter being less conclusive. In the secondary stages of tuberculosis the clinical findings were usually sufficient for diagnosis when the VonPirquet or xray were positive or even doubtful, but little doubt as to the nature of the case remained. Necropsy and observation of cases with unmistakable lesions corroborated these conclusions, many of the cases diagnosed primary tuberculosis developing definite secondary lesions in a short time.

The importance of these studies is apparent when the prognosis of tuberculous infection in the first two years of life is considered; in this series the hospital mortality ran as high as 53 per cent. The prognosis is best when the disease is recognized in the primary stage, but since so many of these cases passed rapidly into the secondary stage it is still not at all good. It is believed that a more general recognition of the early cases, by use of the methods of examination outlined in this paper would improve this grave prognosis. Healed or arrested tuberculosis does not occur in infancy: it behooves physicians to watch constantly for the primary condition and to institute proper treatment if a suspicion of the disease exists. In this way only the high mortality of tuberculosis in infancy can be reduced.

R. N. ANDREWS.

**CAN INJURY OF THE GENITAL GLANDS BY RADIATION LEAD TO THE PRODUCTION OF A PATHOLOGICAL OR LESS WORTHY OFFSPRING:** Nurnberger (*For. auf dem Gebiete der Roent.*, Sept. 30, 1920). The writer reviews the literature and gives the results of animal experiments in answer to the following problems.

1—Conditions governing conception and character of offspring after preceding exposure of the male's testicles to x-ray and other radioactive substances.

Found that the spermatozoa were not killed immediately and that if the male was put with a fertile female within 24 hours after exposure that conception would ensue. After 24 hours, however, the male was sterile. After several months, the exact time depending on the degree of exposure, there was regeneration in the testicle and the females could again conceive from these males. The offspring secured before sterility set in and after regeneration had taken place were in all cases normal.

Statistics were gathered of children of roentgenologists and roentgen workers. While it was apparent that a certain per cent of these were sterile the



children of the others, acquired while the male parent was working with x-ray and afterwards, were in all cases normal.

They concluded upon the basis of animal experiments and statistics of humans exposed to the x-ray that it was impossible to injure the offspring by exposing the testicle to x-rays or radioactive substances.

2—Conditions governing conception and character of offspring after preceding exposure of the ovaries to x-ray and radioactive substances.

Found the same relation applied here, that conception could take place within 24 hours after exposure, but that after 24 hours the females were sterile. This sterility was permanent or temporary depending upon whether or no all of the primordial follicles had been destroyed. If some had escaped they might at some later date come to maturation. Offspring conceived in the first 24 hours and after temporary sterility had disappeared were entirely normal.

The writer reviewed the statistics of females who had been exposed to x-ray and found no abnormality of the offspring. They concluded that no abnormality of the offspring would ensue from exposing the ovary of females to x-ray or radioactive substances.

3—Conditions of conception and character of offspring after preceding exposure of both testicles and ovaries to x-ray and radioactive substances.

Found that the offspring, conceived after sterility had passed, were entirely normal.

4—Condition of offspring of individuals who had been rayed during pregnancy.

Found that exposure of pregnant animals to x-ray had a deleterious influence on the foetus and the pregnancy. Abortion was apt to occur or the child be born dead. However, those offspring which were born alive were in all respects normal.

A review of statistics on humans showed that exposure of the foetus to x-ray might cause intra-uterine death, but that those children which were born alive, lived and were in all respects normal.

5—Experimental observations of the second generations of descendants of animals whose genital glands had been exposed to the x-ray showed no abnormalities. The writer concluded that no dormant abnormalities were present in the descendants of animals exposed to radiation. The conclusions derived from the preceding observations is of marked clinical importance in that the fear of abnormal progeny following x-ray or radium treatment of gynecological conditions has no foundation.

R. G. ALLISON.

**THE PREDOMINANCE OF SEBORRHEIC ECZEMA IN EARLY LIFE:** Thomas S. Southworth (Arch. of Ped., June, 1920) calls attention to the part played by seborrhea in infantile eczema, and states that a predominance of eczemas found in pediatric practice are associated with seborrhea. The clue to this causative factor will be found about the ears and upon the scalp, or perhaps in the fact that the "cradle cap" was of long duration. The ear signs

may be a dry exfoliation or an exuding surface where the pinna join the scalp or beneath the lobe of the ear. He finds significant the predelection of such eczemas for fat babies, whose intake of fat has been excessive. Seborrhea seems to be the predisposing cause for the proneness of eczema to localization about the head, and its tendency to involve the hairy scalp rather than the neck and chest. Zinc and other bland ointments are practically useless in these seborrheic types until to them has been added ammoniated mercury or tar, or resorcin to destroy the micro-organisms present. Of course the dietetic factor must be recognized and corrected.

Particularly does Dr. Southworth call attention to the number of minor cases of dry seborrheic eczema and to the ear and scalp manifestations in the aggravated types of facial eczema in infancy.

N. O. PEARCE.

## BOOK REVIEWS

**"A SHORT HISTORY OF NURSING"** by Lavinia Dock, R. N. and Isabel Maitland Stewart, R. N. (G. P. Putnam's Sons, New York and London, \$3.50).

This history presents to us the Alpha of nursing as an art, which is today, as ever, the finest of the arts and which calls for the highest culture, the greatest patience and most delicate tact. It requires the best, physically, mentally and morally, which it is in human power to give, and we are constantly reminded of this and realize it more fully as we trace the development of this art with the progress of history. We are happy to say that nursing has kept abreast of the times from the year 1 A. D. when Augustus Caesar reigned and Christianity opened a new era to woman. She nobly took up the work and established a systematic, intelligent and merciful care for those who were physically, mentally or morally ill. Nursing gives to woman an opportunity to use her gifts in an administrative, educational or technical position. This has been demonstrated by the progress recorded in the various pages of history and with the introduction of the Nightingale School we have presented to us the more modern methods of nursing. The present day school fashioned after this pattern, has raised its standard of requirement in an educational way and helped the nurse to better fit herself for the serious task for which her duty calls her. The twentieth century nurse has the benefit of the experiences as recorded by those arduous nurses of the past centuries who strived and succeeded in making nursing the art which it is today. It is to be hoped that the progress thus far made by private duty, public health, Red Cross and psychiatric nurses will not cease. Although State registration has been quite generally accepted and conditions greatly bettered, this art will, by its artists, not be considered perfect, nor will they be satisfied until "their good is better and their better best," and it is their aim and ambition to keep this art ever

advancing and as a helpmate of medicine. Although the Alpha of Nursing History has been presented to us we realize that the Omega may be far distant.

DOLORES M. POSCH, R. N.

**"DISEASES OF THE NERVOUS SYSTEM"** a Text Book of Neurology and Psychiatry by Smith Ely Jelliffe, M. D. Ph. D. and William A. White, M. D., Third Edition. Rewritten and Enlarged with 470 Engravings and 12 Plates. Lea and Febiger, Phila. and New York, 1919.

The authors have adopted a new and rather novel classification of the nervous system into three levels—a vegetative, sensori-motor, and psychic; the vegetative to include physico-chemical reactions manifested by **hormone stimulation and inhibition** in the metabolic processes of nutrition, growth, development and involution; the next higher level or sensori-motor, the regulation of the motor apparatus of the body (the field generally described as "neurology" proper), and marked especially by the reflex *reaction*; the third and highest level the psychic, adjusts the individual to his environment and is characterized by *symbols*.

There is an elaborate scheme of methods of examination of the nervous system, and this section is to be very highly commended for its detailed descriptions and illustrations. It will come as a shock to most students of medicine to read that Raynaud's disease and erythromelalgia may be of psychic origin and that psychoanalysis is the treatment; and that attacks in epilepsy are wish fulfilments. The insanities are well described but it is disappointing that more evidence cannot be adduced for the psychic origin of such psychic disorders, and that psychoanalysis while revealing that even the wildest ravings have real basic meanings does not give us better therapeutic results than ductless gland therapy after Abderhalden tests.

It may be a questionable policy to many to find a

text book giving strong adherence to one side of subjects just now so strenuously debated, but in the opinion of the reviewer this is just as justifiable in a text book as in an essay, because while future advances in knowledge will reject much or all of present contentions, the present status of our knowledge is hereby mirrored; and when will we arrive at the time that anything in medicine is definitely settled?

Take it all in all this book is probably the most valuable text book extant today.

HALDOR SNEVE.

**REGIONAL ANAESTHESIA**, by B. Sherwood-Dunn, M. D. (F. A. Davis Company, Philadelphia, \$3.50).

The author in this book presents, in a very concise and intelligent manner, a subject which is assuming larger proportions almost daily in the surgical field. Like all innovations, regional anaesthesia may be classed as a "fad", but the author has accomplished almost the impossible.

The technique, as used by Victor Pauchets with certain modifications, is described in detail, including various types of syringes, needles and solutions used. Practically every known operation has been performed with this technique, a chapter being given over for detailed discussion of this type of anaesthesia of the following operations: cranial, of head and neck, of thorax and abdomen, of genito-urinary organs and rectum, and of extremities.

The fundamental point in the successful use of this type of anaesthesia is an accurate knowledge of the anatomy of the nervous system. The author advocates anaesthesia induced at the "point of exit" of the nerve from the cranium or spinal column.

The manner of presentation, the discussion of the smallest details and the large number of illustrations, charts and diagrams, make this work one almost invaluable to the modern surgeon.

C. K. WILLIAMS.





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# Minnesota State Medical Association

## DISTRICT AND COUNTY ROSTER

### FIRST DISTRICT

COUNCILOR, C. E. DAMPIER, M. D. (1 year) .....Crookston

#### Clay-Becker County Medical Society

Regular meetings, second Thursday of January, April, July and October  
Annual meeting, October

President  
Battelfson, B. T. ....Moorhead

Secretary  
Thornby, H. J. ....Moorhead  
Aborn, W. H. ....Hawley  
Archibald, C. M. ....Mahnomen  
Battelfson, B. T. ....Moorhead  
Campbell, A. A. ....Ogema

Darrow, D. C. ....Moorhead  
Gosslee, G. L. ....Moorhead  
Gunderson, R. M. ....Lake Park  
Hagen, O. J. ....Moorhead  
Haight, G. G. ....Audubon  
Hoit, E. E. ....Detroit  
Humphrey, E. W. ....Moorhead  
Larson, O. O. ....Detroit  
Leach, W. D. ....Calaway

Lowe, L. M. ....Glyndon  
Mieghen, J. W. ....Ulen  
Patterson, C. H. ....Barnesville  
Rutledge, L. H. ....Detroit  
Simison, C. W. ....Hawley  
Thornby, H. J. ....Barnesville  
Thysell, F. A. ....Moorhead  
Verne, V. E. ....Moorhead  
Winberg, O. K. ....Lake Park

#### Red River Valley Medical Society

Kittson, Marshall, Polk, Roseau, Pennington, Red Lake and Norman Counties  
Regular meetings in March, June, September and December  
Annual meeting, December

President  
Kirsch, R. L. ....Crookston

Secretary  
Blegen, H. M. ....Warren  
Adkins, C. M. ....Thief River Falls  
Beiderman, Jacob. Thief River Falls  
Bertelson, O. L. ....Crookston  
Blegen, H. M. ....Warren  
Borreson, B. ....Bemidji  
Bratrud, Theodor. ....Warren  
Bratrud, O. E. ....Warren  
Clark, Lenna E. ....Greenbush  
Clark, C. N. ....Greenbush  
Daniels, W. H. ....Crookston  
Dampier, C. E. ....Crookston  
Delmore, J. L. ....Roseau  
Dryden, F. M. ....Crookston  
Dunlop, Alex. ....Crookston

Fisher, L. F. ....Thief River Falls  
Froelich, H. W. ....Thief River Falls  
Frost, Harry T. ....Crookston  
Griffin, P. J. ....Fertile  
Heimark, J. H. ....Moorhead  
Henney, Wm. H. ....McIntosh  
Hodgson, H. H. ....Crookston  
Holland, A. S. ....Argyle  
Holmes, W. B. ....Ada  
Holte, H. ....Crookston  
Hollands, W. W. ....Fisher  
Johnson, G. L. ....Newfolden  
Just, A. A. ....Crookston  
Kirk, G. P. ....E. Grand Forks  
Kirsch, R. L. ....Crookston  
Kjelland, J. S. ....Crookston  
Lokken, O. E. ....Crookston  
Melby, O. F. ....Thief River Falls  
Meland, O. N. ....Warren

Milan, M. Geo. ....Thief River Falls  
Morley, G. A. ....Crookston  
Nelson, H. E. ....Crookston  
Norman, J. F. ....Crookston  
Ohnstad, J. ....McIntosh  
Olson, O. H. ....Erskine  
Oppegard, M. O. ....Crookston  
Overend, K. S. ....Hallock  
Palm, W. G. ....Climax  
Paulson, A. J. ....Thief River Falls  
Roy, J. A. ....Stephen  
Rystad, O. H. ....Crookston  
Shedlov, A. ....Gully  
Shaleen, A. W. ....Hallock  
Shelland, J. T. ....Ada  
Swedenberg, A. W. ....Thief R. Falls  
Watson, N. M. ....Red Lake Falls  
Wattam, G. S. ....Warren  
Wiltrout, I. Geo. ....Oslo

#### West Central Minnesota Medical Society

Bigstone, Traverse, Stevens, Pope, and part of Grant Counties  
Regular meetings, second Wednesday of January, April and July  
Annual meeting, October

President  
???? ? ? .....??

Secretary  
Leuty, Amos. ....Morris  
Bolsta, Chas. ....Ortonville  
Christenson, C. R. ....Morris  
Caine, C. E. ....Morris

Ewing, C. F. ....Wheaton  
Eberlin, E. A. ....Glenwood  
Fitzgerald, E. J. ....Morris  
Gibbon, L. L. ....Lowry  
Karn, B. R. ....Ortonville  
Linde, Herman. ....Cyrus  
Leland, John J. ....Herman

Leuty, Amos. ....Morris  
O'Donnell, D. M. ....Ortonville  
Oliver, C. L. ....Graceville  
Opheim, O. V. ....Starbuck  
Randall, B. M. ....Graceville  
Ranson, M. L. ....Hancock  
Weir, J. D. ....Beardsley

#### Park Region District Medical Society

Otter Tail, Douglass, Grant and Wilkin Counties  
Regular meetings, Second Wednesday in January, April and July  
Annual meeting, second Wednesday in January

President  
Sargeant, H. L. ....Dalton

Secretary  
Naegeli, Frank. ....Fergus Falls  
Baker, A. C. ....Fergus Falls  
Boysen, P. ....Pelican Rapids  
Brabec, F. J. ....Perham  
Broker, S. S. ....Battle Lake  
Burnap, W. L. ....Fergus Falls  
Cowing, P. G. ....Evansville  
Dahlstrom, A. W. ....?? ? ?  
Drought, W. W. ....Fergus Falls  
Esser, John. ....Perham  
Estrem, C. O. ....Fergus Falls  
Freeborn, J. A. ....Fergus Falls

Gilkinson, A. J. ....Osakis  
Haberman, E. ....Osakis  
Hand, W. R. ....Elbow Lake  
Haskell, A. D. ....Alexandria  
Haugen, G. T. ....Fergus Falls  
Haugen, O. M. ....Fergus Falls  
Hoffman, J. ....Henning  
Kittleson, T. N. ....Fergus Falls  
Lee, W. A. ....Fergus Falls  
Leibold, H. H. ....Parkers Prairie  
Lewis, A. J. ....Henning  
Love, Fred A. ....Carlos  
Meckstroth, C. W. ....Brandon  
Naegeli, F. ....Fergus Falls  
Otto, H. C. ....Frazee

Paulson, T. S. ....Fergus Falls  
Patterson, W. L. ....Fergus Falls  
Powers, F. W. ....Barrett  
Quackenbusch, W. K. ....Battle Lake  
Randall, A. M. ....Ashby  
Reeve, E. T. ....Elbow Lake  
Reimer, S. W. ....Breckenridge  
Sargeant, H. L. ....Dalton  
Satersmoen, Theo. ....Pelican Rapids  
Serkland, J. C. ....?? ? ?  
Sherping, O. Th. ....Fergus Falls  
Stewart, R. L. ....Wendell  
Swanson, R. E. ....Alexandria  
Vigen, J. G. ....Fergus Falls  
Wray, W. E. ....Campbell



## SECOND DISTRICT

COUNCILOR, J. G. MILLSPAUGH, M. D. (2 years) ..... Little Falls

### Aitkin County Medical Society

Regular meetings, first Monday in each month  
Annual meeting, first Monday in December

President  
Graves, Carlton.....Aitkin  
Secretary  
Ratcliffe, J. J.....Aitkin

Catlin, T. J.....Palisade  
Gilbert, Geo. C.....Hill City  
Doyle, Jno. Willis.....Hill City  
Graves, Carlton.....Aitkin

Kelly, B. W.....Aitkin  
McHugh, Roderick.....Aitkin  
Ratcliffe, J. J.....Aitkin

### Upper Mississippi County Medical Society

Crow Wing, Morrison, Cass and Beltrami Counties  
Annual meeting, January 18th

President  
Will, W. W.....Bertha

Secretary  
Badeaux, G. L.....Brainerd  
Allen, F. H.....Staples  
Badeaux, G. L.....Brainerd  
Beach, Geo. Wm.....Dayton, O.  
Beise, R. A.....Brainerd  
Bone, Merle.....Kelliher  
Button, A. J.....Hackensack  
Caldwell, J. M..... ? ? ?  
Campbell, D. R.....Bagley  
Christie, G. R.....Long Prairie  
Collie, H. G..... ? ? ?  
Corrigan, J. E.....Spooner  
Courtney, Walter.....Brainerd  
Craig, C. E.....International Falls  
Douglas, H. E.....Blackduck

Evert, J. A.....Brainerd  
Forest, C. G.....Clearbrook  
Ghostley, Mary C.—  
International Falls  
Gilmore, R.....Bemidji  
Hall, P. M.....State Sanatorium  
Healy, R. F.....Pierz  
Holst, C. F.....Little Falls  
Holst, J. B.....Little Falls  
Ide, A. W.....Brainerd  
Johnson, E. W.....Bemidji  
Kenyon, Paul.....Wadena  
Knickerbocker, F. R.....Staples  
Laney, R. L.....Deer River  
McCann, D. F.....Bemidji  
Marcum, E. H.....Bemidji  
Mattick, Walter.....Wauwatosa, Wis.  
Miller, W. A.....New York Mills  
Millsbaugh, J. G.....Little Falls

Morell, W. N.....Verndale  
Nicholson, J.....Brainerd  
Nordin, C. G.....Brainerd  
Parrott, B. W.....Long Prairie  
Pengelly, E. J.....Ironton  
Pierce, Chas. H.....Wadena  
Reimstead, C. S.....Brainerd  
Roberts, L. M.....Little Falls  
Smith, B. A.....Crosby  
Sweetman, R. H.....Menahga  
Thabes, J. A.....Brainerd  
Van Valkenberg, B. A.—  
Long Prairie  
Watson, A. M.....Royalton  
Watson, John D.....Holdingford  
Wilcox, F. L.....Walker  
Will, W. W.....Bertha  
Williams, A. E.....Backus  
Williams, R. J.....Pine River

## THIRD DISTRICT

COUNCILOR, W. A. DENNIS, M. D. (2 years) ..... St. Paul

### Ramsey County Medical Society

Regular meetings, last Monday of each month except June, July and August  
Annual meeting, last Monday in January

President  
Burch, F. E.....St. Paul

Secretary  
Hammes, E. M.....St. Paul  
Abbott, J. S.....St. Paul  
Abramovich, J. H.....St. Paul  
Aherns, A. E.....St. Paul  
Aherns, A. H.....St. Paul  
Alden, J. F.....St. Paul  
Aldes, Harry.....St. Paul  
Alexander, F. H.....St. Paul  
Allen, Mason.....St. Paul  
Ancker, A. B.....St. Paul  
Arends, A. L.....St. Paul  
Armstrong, J. M.....St. Paul  
Arouni, Khalil.....St. Paul  
Arzt, C. P.....St. Paul  
Bacon, Knox.....St. Paul  
Bacon, L. C.....St. Paul  
Falcone, F. E.....St. Paul  
Ball, C. R.....St. Paul  
Barry, L. W.....St. Paul  
Barsness, Nellie.....St. Paul  
Beadie, W. D.....St. Paul  
Beals, Hugh.....St. Paul  
Beckley, F. L.....St. Paul  
Benepe, L. M.....St. Paul  
Bennion, P. H.....St. Paul  
Bentley, Norman P.....St. Paul  
Berrisford, Paul D.....St. Paul  
Bettingen, J. W. (deceased)—  
St. Paul  
Binger, H. E.....St. Paul  
Birnberg, T. L.....St. Paul  
Bock, R. A.....St. Paul  
Boeckmann, Eduard.....St. Paul  
Boeckmann, Egil.....St. Paul  
Bohland, E. H.....St. Paul  
Bole, R. S.....St. Paul  
Boleyn, E. S.....St. Paul  
Bolstad, H. C.....St. Paul  
Bosworth, Robinson.....St. Paul  
Brand, G. D.....St. Paul

Bray, E. R.....St. Paul  
Brimhall, J. B.....St. Paul  
Brodie, Walter D.....St. Paul  
Brooks, D. F.....St. Paul  
Brown, Ed. I.....St. Paul  
Brown, John C.....St. Paul  
Brown, LeRoy.....St. Paul  
Brown, Silas E.....St. Paul  
Buckley, E. W.....St. Paul  
Burch, F. E.....St. Paul  
Burns, F. W.....St. Paul  
Burns, R. M.....St. Paul  
Buscher, H.....St. Paul  
Cameron, J. A.....St. Paul  
Campbell, E. Paul.....St. Paul  
Campbell, J. E.....St. Paul  
Cannon, C. N.....St. Paul  
Cannon, Harry.....St. Paul  
Carman, C. L.....St. Paul  
Carman, Paul I.....St. Paul  
Carroll, Wm. C.....St. Paul  
Cavanaugh, J. O.....St. Paul  
Chamberlin, J. W.....St. Paul  
Chatterton, C. C.....St. Paul  
Christiansen, A.....St. Paul  
Christison, J. T.....St. Paul  
Clark, T. C.....St. Paul  
Cobb, S. G.....St. Paul  
Cole, Wallace H.....St. Paul  
Colvin, A. R.....St. Paul  
Comstock, A. E.....St. Paul  
Conheim, Eva.....St. Paul  
Connor, C. E.....St. Paul  
Cook, Paul B.....St. Paul  
Cornica, A. D.....St. Paul  
Cowern, E. W.....St. Paul  
Dack, Lloyd G.....St. Paul  
Darling, J. B.....St. Paul  
Daugherty, E. B.....St. Paul  
Daugherty, L. E.....St. Paul  
Davis, Herbert.....St. Paul  
Davis, William.....St. Paul  
Deidolph, Karl.....St. Paul  
Dennis, W. A.....St. Paul

Dickson, Thos. H., Jr.....St. Paul  
Dittman, Geo. C.....St. Paul  
Dohm, A. J.....St. Paul  
Drake, Carl B.....St. Paul  
Dunn, J. N.....St. Paul  
Earl, George A.....St. Paul  
Earl, Robert O.....St. Paul  
Ely, O. S.....St. Paul  
Engberg, E. J.....St. Paul  
Ernest, G. C.....St. Paul  
Eshelby, E. C.....St. Paul  
Ferguson, J. C.....St. Paul  
Fogarty, Chas. W.....St. Paul  
Freeman, C. D.....St. Paul  
Fulton, J. F.....St. Paul  
Furber, W. W.....St. Paul  
Gauger, E. C.....St. Paul  
Geer, Everett K.....St. Paul  
Geissinger, John D.....St. Paul  
Geist, George A.....St. Paul  
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Ghent, M. M.....St. Paul  
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Gillette, A. J.....St. Paul  
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Goltz, E. V.....St. Paul  
Gotham, C. L.....St. Paul  
Gratzek, Thos.....St. Paul  
Greene, Charles L.....St. Paul  
Groebner, Otto A.....St. Paul  
Gruenhagen, Arnold P.....St. Paul  
Gumper, J. B.....St. Paul  
Hagaman, Geo. K.....St. Paul  
Hall, A. R.....St. Paul  
Hammes, E. M.....St. Paul  
Hammond, J. F.....St. Paul  
Hathaway, S. J.....St. Paul  
Hawkins, V. J.....St. Paul  
Heath, A. C.....St. Paul  
Hengstler, W. H.....St. Paul  
Hensel, C. N.....St. Paul  
Hermann, Edgar T.....St. Paul  
Heseltine, Verner T.....St. Paul  
Hesselgrave, S. S.....St. Paul

|                             |            |                          |          |                            |              |
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| Hilger, D. D.....           | St. Paul   | MacLaren, Archibald..... | St. Paul | Schulze, Albert G.....     | St. Paul     |
| Hilger, L. A.....           | St. Paul   | Maloney, T. J.....       | St. Paul | Schwyzer, Arnold.....      | St. Paul     |
| Hoff, Alfred.....           | St. Paul   | Mark, Arthur E.....      | St. Paul | Senkler, G. E.....         | St. Paul     |
| Hoff, Peder A.....          | St. Paul   | Martineau, J. L.....     | St. Paul | Shapers, A. D.....         | St. Paul     |
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| Holcomb, O. W.....          | St. Paul   | Mitchell, Frederick..... | St. Paul | Shannon, Ray.....          | St. Paul     |
| Holl, P. M.....             | St. Paul   | Mogilner, S. N.....      | St. Paul | Shimonek, Anton.....       | St. Paul     |
| Howard, W. S.....           | St. Paul   | Molander, H. A.....      | St. Paul | Simon, B. F.....           | St. Paul     |
| Hubert, R. I.....           | St. Paul   | Molzahn, Herman E.....   | St. Paul | Simon, Geo. H.....         | St. Paul     |
| Hullseik, H. E.....         | St. Paul   | Morrissey, F. B.....     | St. Paul | Skinner, H. O.....         | St. Paul     |
| Hunt, H. E.....             | St. Paul   | Mortenson, N. G.....     | St. Paul | Smith, Charles E., Jr..... | St. Paul     |
| Jeslon, J. W.....           | St. Paul   | Moynihan, T. J.....      | St. Paul | Sneve, Haldor.....         | St. Paul     |
| Johnson, Asa M.....         | St. Paul   | Murphy, E. F.....        | St. Paul | Sohlberg, Olof.....        | St. Paul     |
| Johnson, Hartland C.....    | St. Paul   | Myers, Thos.....         | St. Paul | Staley, J. C.....          | St. Paul     |
| Johnson, T. H.....          | St. Paul   | Neher, F. H.....         | St. Paul | Steen, A. H.....           | St. Paul     |
| Jones, E. M.....            | St. Paul   | Nelson, L. A.....        | St. Paul | Sterner, E. G.....         | St. Paul     |
| Kannary, E. L.....          | St. Paul   | Nippert, H. T.....       | St. Paul | Sterner, O. W.....         | St. Paul     |
| Kelly, John H.....          | St. Paul   | Norris, Edgar H.....     | St. Paul | Stevens, F. A.....         | St. Paul     |
| Kelly, Paul H.....          | St. Paul   | Nye, Katherine A.....    | St. Paul | Stierle, Adolph, Jr.....   | St. Paul     |
| Kern, M. J.....             | St. Paul   | O'Brien, H. J.....       | St. Paul | Stinnette, S. W.....       | St. Paul     |
| Kesting, Herman.....        | St. Paul   | Oerting, Harry.....      | St. Paul | Stolpestad, H. L.....      | St. Paul     |
| Kittleson, John A.....      | St. Paul   | Ogden, B. H.....         | St. Paul | Sutton, L. F.....          | St. Paul     |
| Kling, Walter E.....        | St. Paul   | Ohage, Justus, Jr.....   | St. Paul | Swanson, Edwin O.....      | St. Paul     |
| Klein, H. N.....            | St. Paul   | Olson, Chas. A.....      | St. Paul | Sweeney, Arthur.....       | St. Paul     |
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| Kramer, G. B.....           | St. Paul   | Pearson, F. R.....       | St. Paul | Telsberg, C. B.....        | St. Paul     |
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| Lerche, Wm.....             | St. Paul   | Richards, E. T. F.....   | St. Paul | Welch, M. C.....           | St. Paul     |
| Lewis, J. B.....            | St. Paul   | Riggs, C. E.....         | St. Paul | Wheeler, M. W.....         | St. Paul     |
| Lewis, W. W.....            | St. Paul   | Ritchie, H. P.....       | St. Paul | Whitacre, J. C.....        | St. Paul     |
| Lick, C. Louis.....         | St. Paul   | Rogers, John T.....      | St. Paul | Whitcomb, Ed. H.....       | St. Paul     |
| Little, W. J.....           | St. Paul   | Rothrock, J. L.....      | St. Paul | White, J. S.....           | St. Paul     |
| Lufkin, H. M.....           | St. Paul   | Rothschild, H. J.....    | St. Paul | Whitmore, F. W.....        | St. Paul     |
| McCarthy, W. R.....         | St. Paul   | Roy, Philomen.....       | St. Paul | Whitney, A. W.....         | St. Paul     |
| McClanahan, J. H.....       | White Bear | Rutherford, W. C.....    | St. Paul | Williams, Clayton.....     | St. Paul     |
| McClanahan, T. S.....       | White Bear | Ryan, John J.....        | St. Paul | Winnick, J. B.....         | St. Paul     |
| McCloud, C. N.....          | St. Paul   | Savage, F. J.....        | St. Paul | Wold, K. C.....            | St. Paul     |
| McCormick, Thos. F.....     | St. Paul   | Schatz, F. J.....        | St. Paul | Wood, H. G.....            | St. Paul     |
| McDavitt, Thos.....         | St. Paul   | Schoch, R. B.....        | St. Paul | Zander, C. H.....          | St. Paul     |
| McKeon, Owen.....           | St. Paul   | Schons, E.....           | St. Paul | Zimmerman, H. B.....       | St. Paul     |
| McLaren, Jennette.....      | St. Paul   |                          |          |                            |              |

#### Washington County Medical Society

Regular meetings held the second Tuesday of the odd numbered months  
Annual meeting, November

|                    |                       |            |                     |             |
|--------------------|-----------------------|------------|---------------------|-------------|
| President          | Burfiend, G. H.....   | St. Paul   | Landeen, F. G.....  | Stillwater  |
| Newman, G. A.....  | Clark, G. E.....      | Stillwater | Mingo, F. E.....    | Hugo        |
| Secretary          | Freligh, E. O. B..... | Stillwater | Newman, G. A.....   | Stillwater  |
| Landeen, F. G..... | Haines, J. H.....     | Stillwater | Poirier, J. A.....  | Forest Lake |
|                    | Humphrey, W. R.....   | Stillwater | Stuhr, J. W.....    | Stillwater  |
|                    | Kalinoff, D.....      | Stillwater | Thompson, V. C..... | Stillwater  |

#### Chisago-Pine County Medical Society

Regular meetings, January and July  
Annual meeting, January

|                     |                    |              |                         |                |
|---------------------|--------------------|--------------|-------------------------|----------------|
| President           | Bohling, B. S..... | Sandstone    | Magnusson, Herman V.... | Bell, Cal.     |
| Murdock, H. G.....  | Dredge, H. P.....  | Sandstone    | Murdock, H. G.....      | Taylor's Falls |
| Secretary           | Ehmke, Wm. E.....  | Willow River | Stowe, A. J.....        | Rush City      |
| Anderson, C. A..... | Flom, A. O.....    | Chisago City | Tilton, A. J.....       | Alden          |
| Anderson, C. A..... | Kelsey, C. G.....  | Hinckley     | Werner, O. S.....       | Lindstrom      |
|                     | Gray, C. E.....    | Rush City    | Wiseman, R. L.....      | Pine City      |
|                     | Gunz, A. N.....    | Center City  | Zeien, Thos.....        | North Branch   |

#### Central Minnesota District Medical Society

Mille Lacs, Sherburne, Isanti and Kanabec  
Regular meetings, January, April, July and October  
Annual meeting, July

|                    |                       |           |                       |           |
|--------------------|-----------------------|-----------|-----------------------|-----------|
| President          | Bacon, H. P.....      | Milaca    | Phelps, A. G.....     | Ogilvie   |
| Cooney, H. C.....  | Clifton, Theo. A..... | Isanti    | Rhein, J. E.....      | Mora      |
| Secretary          | Cooney, H. C.....     | Princeton | Roodman, I. M.....    | Ponsford  |
| Parsons, G. E..... | Parsons, G. E.....    | Elk River | Shulean, Nellie.....  | Cambridge |
|                    |                       |           | Swensen, Charles..... | Braham    |



## St. Louis County Medical Society

Itasca, Cook and Lake

Regular meetings, second Thursday of each month  
Annual meeting, second Thursday in October

### President

Shapiro, E. Z. .... Duluth

### Secretary

Forbes, R. S. .... Duluth  
Abbott, Wm. P. .... Duluth  
Adams, B. S. .... Hibbing  
Arminen, K. V. .... Duluth  
Ayres, C. T. .... Ely  
Barney, L. A. .... Duluth  
Bagley, W. R. .... Duluth  
Berquist, K. E. .... Duluth  
Binet, H. E. .... Grand Rapids  
Boyer, S. H. .... Duluth  
Braden, A. J. .... Duluth  
Bray, C. W. .... Biwabik  
Brooks, G. F. .... Minneapolis  
Bullen, F. W. .... Hibbing  
Carstons, C. F. .... Hibbing  
Chapman, T. L. .... Duluth  
Cheney, E. L. .... Duluth  
Clark, F. F. .... Duluth  
Collins, A. N. .... Duluth  
Collins, H. C. .... Duluth  
Conkey, C. D. .... Duluth  
Cosgrove, J. H. .... Duluth  
Coventry, W. A. .... Duluth  
Crowe, J. H. .... Virginia  
Davis, H. S. .... Duluth  
Davis, B. J. .... Duluth  
Deslauriers, A. A. .... Duluth  
Doolittle, L. E. .... Duluth  
Drenning, F. C. .... Duluth  
Durgin, F. L. .... Nopeming  
Eissenman, W. G. .... Chisholm  
Ekblad, J. W. .... Duluth  
Eklund, J. J. .... Duluth  
Eklund, Wm. J. .... Duluth  
Ellas, F. J. .... Duluth  
Fahey, E. W. .... Duluth  
Forbes, R. S. .... Duluth  
Farmer, J. C. .... McKinley  
Gendron, J. F. .... Grand Rapids  
Gillespie, N. H. .... Duluth  
Giroux, A. A. .... Duluth  
Goodman, C. E. .... Virginia

Graham, David. .... Duluth  
Graham, R. D. .... Duluth  
Graham, Robert. .... Duluth  
Grawn, F. A. .... Duluth  
Greeley, L. Q. .... Duluth  
Ground, H. T. .... Virginia  
Gauthier, W. .... Virginia  
Hall, Andrea E. .... Cusson  
Haney, C. L. .... Duluth  
Hayes, M. F. .... Nashwauk  
Heimark, O. E. .... Duluth  
Hirschboeck, F. J. .... Duluth  
Hirschfield, M. S. .... Duluth  
Hursh, M. M. .... Grand Rapids  
Jensen, T. J. .... Duluth  
Judson, W. E. .... Duluth  
Kean, N. D. .... Coleraine  
Kiesling, I. H. .... Nashwauk  
Keyes, C. R. .... Duluth  
King, W. S. .... Eveleth  
Kraft, Peter. .... Duluth  
Kuth, J. R. .... Duluth  
Klein, Harry. .... Duluth  
Laird, A. T. .... Nopeming  
Lenont, C. B. .... Virginia  
Lepak, F. J. .... Duluth  
Lindgren, E. I. .... Duluth  
Linneman, N. L. .... Duluth  
Loofbourrow, Elias Homer. .... Keewatin  
Lum, C. E. .... Duluth  
Lynam, Frank. .... Duluth  
McComb, C. F. .... Duluth  
McCuen, J. A. .... Duluth  
McDonald, A. L. .... Duluth  
McGiffert, E. N. .... Duluth  
McHaffie, O. L. .... Duluth  
Magie, W. H. .... Duluth  
Martin, Edw. T. .... Marble  
Martin, T. R. .... Duluth  
Merriman, L. L. .... Duluth  
Morsman, L. W. .... Hibbing  
Morss, C. R. .... Coleraine  
More, C. W. .... Eveleth  
Murray, D. D. .... Duluth

Nicholson, M. A. .... Duluth  
O'Neil, J. W. .... Nashwauk  
Oredson, O. A. .... Duluth  
McGehre, E. C. .... Hibbing  
Pake, S. G. .... Duluth  
Paradine, J. .... Duluth  
Pare, L. T. .... Duluth  
Parker, O. W. .... Ely  
Payette, C. H. .... Duluth  
Powers, J. E. .... Duluth  
Pennie, D. F. .... Duluth  
Raadquist, C. S. .... Hibbing  
Raihala, John. .... Virginia  
Reynolds, Hugh. .... Hibbing  
Rippert, J. A. .... Proctor  
Robinson, J. M. .... Duluth  
Rood, D. C. .... Hibbing  
Rowe, O. W. .... Duluth  
Scherer, C. A. .... Duluth  
Schroder, C. H. .... Duluth  
Schwartz, A. H. .... Duluth  
Seashore, D. E. .... Duluth  
Shapiro, E. Z. .... Duluth  
Shaw, A. W. .... Buhl  
Slyfield, F. F. .... Duluth  
Smith, C. M. .... Coleraine  
Spicer, F. W. .... Duluth  
Strothern, M. L. .... Gilbert  
Sukeforth, L. A. .... Duluth  
Sutherland, H. N. .... Ely  
St. Clair, G. G. .... Duluth  
Saam, J. G. .... Eveleth  
Taylor, A. C. .... Duluth  
Taylor, C. W. .... Duluth  
Tibbetts, M. H. .... Duluth  
Tilderquist, D. L. .... Duluth  
Tuohy, E. L. .... Duluth  
Turnbull, F. M. .... Duluth  
Vercellini, C. E. .... Duluth  
Walker, A. E. .... Duluth  
Webber, Edward E. .... Proctor  
Webster, H. E. .... Duluth  
Wilkinson, Stella. .... Duluth  
Winter, J. A. .... Duluth  
Young, V. A. .... Duluth

## Carlton County Medical Society

Regular meetings, second Friday of each month  
Annual meeting, December

### President

Stuart, A. B. .... Cloquet

### Secretary

Raiter, Franklin W. S. .... Cloquet

Blakeley, C. C. .... Barrum  
Brunet, L. M. .... Cloquet  
Fleming, James. .... Cloquet  
Gilbert, John. .... Carlton

Raiter, Franklin W. S. .... Cloquet  
Spurbeck, R. G. .... Cloquet  
Stuart, A. B. .... Cloquet  
Walters, Franklin R. .... Moose Lake, Minn.

## FOURTH DISTRICT

COUNCILOR, R. J. HILL, (1 year) .... Minneapolis

## Hennepin County Medical Society

Minneapolis

### President

Head, George Douglas. .... Minneapolis

### Secretary

La Vake, R. T. .... Minneapolis  
Abbott, A. W. .... Minneapolis  
Adair, F. L. .... Minneapolis  
Allen, H. W. .... Minneapolis  
Anderson, A. E. .... Minneapolis  
Anderson, A. G. .... Minneapolis  
Anderson, J. D. .... Minneapolis  
Annis, H. B. .... Minneapolis  
Arey, H. C. .... Excelsior  
Aune, Martin. .... Minneapolis  
Aurand, W. H. .... Minneapolis  
Austin, E. E. .... Minneapolis  
Avery, J. F. .... Minneapolis  
Aylmer, A. L. .... Minneapolis  
Baker, A. T. .... Minneapolis  
Baker, E. L. .... Minneapolis  
Baker, H. A. .... Minneapolis  
Baker, Loe. .... Minneapolis  
Bakke, O. H. .... Minneapolis  
Baldwin, L. B. .... Minneapolis  
Bank, Harry E. .... Minneapolis  
Barron, Moses. .... Minneapolis

Barton, Edgar R. .... Minneapolis  
Baxter, S. H. .... Minneapolis  
Beard, Archie H. .... Minneapolis  
Beaudoux, Henry A. .... Minneapolis  
Bell, J. W. Jr. .... Minneapolis  
Bell, J. W. .... Minneapolis  
Benedict, E. E. .... Minneapolis  
Benjamin, A. E. .... Minneapolis  
Benn, F. G. .... Minneapolis  
Benson, Geo. E. .... Minneapolis  
Bessesen, A. N. .... Minneapolis  
Bishop, Chas. W. .... Minneapolis  
Bissell, F. S. .... Minneapolis  
Blake, James. .... Minneapolis  
Bockman, M. .... Minneapolis  
Booth, A. E. .... Minneapolis  
Boquist, E. T. W. .... Minneapolis  
Boreen, C. A. .... Minneapolis  
Bouman, H. A. .... Minneapolis  
Bratrud, A. F. .... Minneapolis  
Brooks, Chas. N. .... Minneapolis  
Brown, Edgar D. .... Minneapolis  
Brown, Paul F. .... Minneapolis  
Brown, R. S. .... Minneapolis  
Butler, John. .... Minneapolis  
Byrnes, W. J. .... Minneapolis

Cabot, V. S. .... Minneapolis  
Camp, W. E. .... Minneapolis  
Campbell, L. M. .... Minneapolis  
Carlson, C. M. .... Minneapolis  
Cavanor, F. T. .... Minneapolis  
Craft, Leo M. .... Minneapolis  
Cheleen, S. J. .... Minneapolis  
Cirkler, A. A. .... Minneapolis  
Clark, H. S. .... Minneapolis  
Cockrane, W. M. .... Minneapolis  
Condit, W. H. .... Minneapolis  
Cook, Henry W. .... Minneapolis  
Corbett, Frank J. .... Minneapolis  
Cosman, E. O. .... Minneapolis  
Cranmer, Richard R. .... Minneapolis  
Crume, Geo. P. .... Minneapolis  
Dahl, John A. .... Minneapolis  
Dart, Leslie O. .... Minneapolis  
Deziel, G. .... Minneapolis  
Disen, C. F. .... Minneapolis  
Donaldson, C. A. .... Minneapolis  
Doxey, G. L. .... Minneapolis  
Drake, C. R. .... Minneapolis  
Driesbach, N. .... Minneapolis  
Dunn, Louis. .... Minneapolis  
Dunsmoor, F. A. .... Minneapolis

|                          |             |                            |             |                         |             |
|--------------------------|-------------|----------------------------|-------------|-------------------------|-------------|
| Egan, John M.....        | Minneapolis | Lewis, J. D.....           | Minneapolis | Roan, Carl M.....       | Minneapolis |
| Eitel G. G.....          | Minneapolis | Lind, C. J.....            | Minneapolis | Robert, Thomas S.....   | Minneapolis |
| Erb, F. A.....           | Minneapolis | Linner, H. P.....          | Minneapolis | Roberts, W. B.....      | Minneapolis |
| Erickson, J. G.....      | Minneapolis | Linstrom, Jarl.....        | Minneapolis | Robertson, H. E.....    | Minneapolis |
| Fansler, W. A.....       | Minneapolis | Litchfield, John T.....    | Minneapolis | Rochford, W. E.....     | Minneapolis |
| Farr, R. E.....          | Minneapolis | Litzenberg, J. C.....      | Minneapolis | Robitshek, E. C.....    | Minneapolis |
| Fisher, F.....           | Minneapolis | Logefell, Rudolph C.....   | Minneapolis | Rodda, F. C.....        | Minneapolis |
| Fjelstad, C. Alford..... | Minneapolis | Loomis, E. A.....          | Minneapolis | Rodgers, C. L.....      | Minneapolis |
| Flemming, A. S.....      | Minneapolis | Lundgren, A. C.....        | Minneapolis | Rosen, S.....           | Minneapolis |
| Franzen, H. G.....       | Minneapolis | Lynch, M. J.....           | Minneapolis | Schaaf, F. H. K.....    | Minneapolis |
| Gardner, Edwin L.....    | Minneapolis | Lyon, J. D.....            | Minneapolis | Scheffek, J. F.....     | Minneapolis |
| Giessler, Paul W.....    | Minneapolis | Lyng, John.....            | Minneapolis | Schneider, J. P.....    | Minneapolis |
| Geist, Emil S.....       | Minneapolis | Lysne, Henry.....          | Minneapolis | Schultz, Fred W.....    | Minneapolis |
| Green, E. K.....         | Minneapolis | MacDonald, D. A.....       | Minneapolis | Schwyzzer, G.....       | Minneapolis |
| Gordon, Geo. J.....      | Minneapolis | McEachran, A.....          | Minneapolis | Seashore, Gilbert.....  | Minneapolis |
| Guilford, H. M.....      | Minneapolis | McDaniel, Orianna.....     | Minneapolis | Sedgwick, J. P.....     | Minneapolis |
| Gunderson, Harley J..... | Minneapolis | McDermott, T. E.....       | Minneapolis | Seham, Max.....         | Minneapolis |
| Hagen, G. L.....         | Minneapolis | McDonald, H. N.....        | Minneapolis | Sessions, John.....     | Minneapolis |
| Haggard, G. D.....       | Minneapolis | McDonald, Irving C.....    | Minneapolis | Simons, Jalmar.....     | Minneapolis |
| Hall, J. M.....          | Minneapolis | McIntyre, George.....      | Minneapolis | Simpson, E. D.....      | Minneapolis |
| Hallowell, W. H.....     | Minneapolis | McKinney, F. S.....        | Minneapolis | Simpson, J. D.....      | Minneapolis |
| Hamel, Arnold L.....     | Minneapolis | McLaughlin, Jos. A.....    | Minneapolis | Sivertsen, Ivar.....    | Minneapolis |
| Hamel, C. E.....         | Minneapolis | McPheeters, H. O.....      | Minneapolis | Slocumb, Maude S.....   | Minneapolis |
| Hamilton, A. S.....      | Minneapolis | Macnie, J. S.....          | Minneapolis | Smith, Arthur.....      | Minneapolis |
| Hanson, Erling.....      | Minneapolis | Mann, A. T.....            | Minneapolis | Smith, Homer R.....     | Minneapolis |
| Hanson, Olga S.....      | Minneapolis | Mathews, Justus.....       | Minneapolis | Smith, Norman.....      | Minneapolis |
| Hare, E. R.....          | Minneapolis | Marclay, W. J.....         | Minneapolis | Soderlind, A.....       | Minneapolis |
| Harrington, C. D.....    | Minneapolis | Marlette, Ernest.....      | Hopkins     | Souba, Fred J.....      | Minneapolis |
| Hartzell, Thomas B.....  | Minneapolis | Mark, D. B.....            | Minneapolis | Spratt, C. N.....       | Minneapolis |
| Haverfield, Addie K..... | Minneapolis | Mead, Marion.....          | Minneapolis | Staples, H. L.....      | Minneapolis |
| Head, G. D.....          | Minneapolis | Markert, G. L.....         | Minneapolis | Stomel, Joseph.....     | Minneapolis |
| Hedback, A. E.....       | Minneapolis | Meyer, E. L.....           | Minneapolis | Stuhr, Henry C.....     | Minneapolis |
| Heim, Russell R.....     | Minneapolis | Michael, J. C.....         | Minneapolis | Strachauer, A. C.....   | Minneapolis |
| Helk, H. H.....          | Minneapolis | Moir, Wm. W.....           | Minneapolis | Strout, E. S.....       | Minneapolis |
| Hendrickson, J. F.....   | Minneapolis | Monahan, J. A.....         | Minneapolis | Sweetser, H. B.....     | Minneapolis |
| Henry, C. E.....         | Minneapolis | Monahan, R. H.....         | Minneapolis | Sweetser, Theo.....     | Minneapolis |
| Herrick, Stanley E.....  | Minneapolis | Moorhead, M. B.....        | Minneapolis | Switzer, S. E.....      | Minneapolis |
| Hiebert, J. P.....       | Minneapolis | More, E.....               | Minneapolis | Taft, John O.....       | Minneapolis |
| Higgins, J. H.....       | Minneapolis | Morse, John.....           | Minneapolis | Taft, Walter L.....     | Minneapolis |
| Hill, Eleanor J.....     | Minneapolis | Morris, R. E.....          | Minneapolis | Tanner, A. C.....       | Minneapolis |
| Hill, R. J.....          | Minneapolis | Morrison, A. W.....        | Minneapolis | Ten Broeck, Louis.....  | Minneapolis |
| Hobbs, C. A.....         | Minneapolis | Morton, H. Mc.....         | Minneapolis | Tennyson, Theo.....     | Minneapolis |
| Hodge, S. V.....         | Minneapolis | Murdoch, A. J.....         | Minneapolis | Thomas, D. O.....       | Minneapolis |
| Howe, A. W.....          | Minneapolis | Murphy, T. J.....          | Minneapolis | Thomas, Geo. E.....     | Minneapolis |
| Huenekens, E. J.....     | Minneapolis | Murray, W. R.....          | Minneapolis | Thomas, Gilbert A.....  | Minneapolis |
| Hynes, John E.....       | Minneapolis | Nelson, C. P.....          | Minneapolis | Thompson, H. H.....     | Minneapolis |
| Hvoslef, Jacob.....      | Minneapolis | Nelson, H. S.....          | Minneapolis | Tingdale, A. C.....     | Minneapolis |
| Iden, B. F.....          | Minneapolis | Newhart, Horace.....       | Minneapolis | Towers, F. E.....       | Minneapolis |
| Ikedo, Kano.....         | Minneapolis | Nippert, L. A.....         | Minneapolis | Tunstead, Hugh.....     | Minneapolis |
| Irvine, H. G.....        | Minneapolis | Nissen, Henrik.....        | Minneapolis | Tyrrell, C. C.....      | Minneapolis |
| Jarvis, Bruce W.....     | Minneapolis | Nixon, Chas. C.....        | Minneapolis | Ulrich, Henry L.....    | Minneapolis |
| Jenson, M. J.....        | Minneapolis | Nordin, G. T.....          | Minneapolis | Ulrich, Mabel S.....    | Minneapolis |
| Jones, H. W.....         | Minneapolis | Noonan, Dan F.....         | Minneapolis | Undine, A. Clyde.....   | Minneapolis |
| Jones, W. A.....         | Minneapolis | Nordland, Martin.....      | Minneapolis | Urstad, O. H.....       | Minneapolis |
| Johnson, A. Elov.....    | Minneapolis | Noth, H. W.....            | Minneapolis | Van Deboget, Lewis..... | Minneapolis |
| Johnson, Carl E.....     | Minneapolis | Oberg, C. M.....           | Minneapolis | Ylvisaker, L. S.....    | Minneapolis |
| Johnson, James A.....    | Minneapolis | O'Donnel, J. E.....        | Minneapolis | Voyer, Oswald.....      | Minneapolis |
| Johnson, Julius.....     | Minneapolis | Olson, F. A.....           | Minneapolis | Waldron, Carl W.....    | Minneapolis |
| Johnson, Nimrod.....     | Minneapolis | Orton, H. N.....           | Minneapolis | Wanous, E. Z.....       | Minneapolis |
| Johnson, R. A.....       | Minneapolis | Owre, Oscar.....           | Minneapolis | Ward, A. W.....         | Minneapolis |
| Josewich, Alexander..... | Minneapolis | Paulsen, E. L.....         | Minneapolis | Warham, T. T.....       | Minneapolis |
| Kennedy, C. C.....       | Minneapolis | Parker, E. H.....          | Minneapolis | Watson, J. A.....       | Minneapolis |
| Kennedy, Jane F.....     | Minneapolis | Parks, A. H.....           | Minneapolis | Webb, R. C.....         | Minneapolis |
| Kennedy, R. Ray.....     | Minneapolis | Patterson, W. E.....       | Minneapolis | Weisman, S. A.....      | Minneapolis |
| Kimball, H. H.....       | Minneapolis | Pedersen, R. M.....        | Minneapolis | Wells, H. J.....        | Minneapolis |
| King, W. R.....          | Minneapolis | Peppard, T. A.....         | Minneapolis | Weston, C. G.....       | Minneapolis |
| King, E. A.....          | Minneapolis | Perry, Ralph St. John..... | Minneapolis | Weum, T. Wm.....        | Minneapolis |
| Kirms, Geo. W.....       | Minneapolis | Peters, R. M.....          | Minneapolis | White, Marx S.....      | Minneapolis |
| Kistler, C. M.....       | Minneapolis | Peterson, O. H.....        | Minneapolis | Wilcox, Ancha E.....    | Minneapolis |
| Koch, John Charles.....  | Minneapolis | Peterson, Thorvald.....    | Minneapolis | Wilcox, M. Russell..... | Minneapolis |
| Kohler, G. A.....        | Minneapolis | Pettitt, C. W.....         | Minneapolis | Willcutt, Clarence..... | Minneapolis |
| Koller, Herman M.....    | Minneapolis | Phelps, Kenneth.....       | Minneapolis | Williams, Robert.....   | Minneapolis |
| Koller, L. R.....        | Minneapolis | Pineo, W. B.....           | Minneapolis | Willson, Hugh S.....    | Minneapolis |
| Knight, H. L.....        | Minneapolis | Poehler, F. T.....         | Minneapolis | Witham, C. A.....       | Minneapolis |
| Kremer, Walter J.....    | Minneapolis | Poppe, Fred H.....         | Minneapolis | Wittich, F. W.....      | Minneapolis |
| Kusske, A. L.....        | Minneapolis | Pratt, Fred J.....         | Minneapolis | Wohlrabe, A. A.....     | Minneapolis |
| La Vake, R. T.....       | Minneapolis | Pratt, J. A.....           | Minneapolis | Wood, Douglas F.....    | Minneapolis |
| Lajoie, John M.....      | Minneapolis | Priene, I. A.....          | Minneapolis | Woodard, F. R.....      | Minneapolis |
| La Pierre, C. A.....     | Minneapolis | Prim, J. A.....            | Minneapolis | Wright, C. B.....       | Minneapolis |
| Law, A. A.....           | Minneapolis | Quinby, Thomas F.....      | Minneapolis | Wright, C. Darcy.....   | Minneapolis |
| Laurent, A. A.....       | Minneapolis | Quist, H. W.....           | Minneapolis | Wright, Franklin R..... | Minneapolis |
| Leavitt, H. H.....       | Minneapolis | Rees, S. P.....            | Minneapolis | Wynne, H. M. N.....     | Minneapolis |
| Lebowski, Joseph A.....  | Minneapolis | Reynolds, J. S.....        | Minneapolis | Yoerg, O. W.....        | Minneapolis |
| Leland, M. N.....        | Minneapolis | Rishmiller, J. H.....      | Minneapolis | Zaworske, E. A.....     | Minneapolis |
|                          |             |                            |             | Ziskin, Thomas.....     | Minneapolis |

#### Wright County Medical Society

Regular meetings, first Monday quarterly  
Annual meeting, October

|                   |             |
|-------------------|-------------|
| President         |             |
| Harriman, L.....  | Howard Lake |
| Secretary         |             |
| Catlin, J. J..... | Buffalo     |
| Catlin, J. J..... | Buffalo     |

|                        |             |
|------------------------|-------------|
| Flilison, Frank E..... | Monticello  |
| Freed, O. J. R.....    | Cokato      |
| Harriman, L.....       | Howard Lake |
| Metcalf, James N.....  | Monticello  |
| Moffatt, A. G.....     | Howard Lake |
| Phillips, A. E.....    | Delano      |

|                      |             |
|----------------------|-------------|
| Ridgway, A. M.....   | Annandale   |
| Roholt, C. L.....    | South Haven |
| Rosseau, Victor..... | Maple Lake  |
| Shrader, E. E.....   | Watertown   |
| Thoresen, Th.....    | Buffalo     |
| Hawkins, E. P.....   | Montrose    |



### Meeker County Medical Society

President  
Donovan, J. J. ....Litchfield  
Secretary  
Danielson, K. A. ....Litchfield  
Brigham, Frank Eden.....Valley

Chapman, W. E. ....Litchfield  
Cutts, G. A. C. ....Litchfield  
Danielson, K. A. ....Litchfield  
Donovan, J. J. ....Litchfield  
Dulude, S. ....Dassel

O'Connor, Dr. ....Eden Valley  
Peterson, Alfred. ....Dassel  
Robertson, W. P. ....Litchfield  
Robertson, A. W. ....Litchfield  
Sturte, J. R. ....Watkins

### Stearns-Benton County Medical Society

Regular meetings, quarterly  
Annual meeting, third Thursday in April

President  
Beebe, W. L. ....St. Cloud  
Secretary  
Clark, H. B. ....St. Cloud  
Ausman, C. F. ....Paynesville  
Beebe, W. L. ....St. Cloud  
Boehm, J. C. ....St. Cloud  
Beaty, J. H. ....St. Cloud  
Brigham, C. F. ....St. Cloud  
Clark, H. B. ....St. Cloud  
DuBois, J. A. ....Sauk Center  
DuBois, I. F. ....Sauk Center  
Edmunds, I. L. ....Clearwater

Freeman, W. L. ....Foley  
Friesleben, Wm. ....Sauk Rapids  
Pilon, P. C. ....Paynesville  
Putney, G. E. ....Paynesville  
Rathburne, A. M. ....Rice  
Rathburne, C. A. ....Sauk Rapids  
Ridgeway, Alex. ....Belgrade  
Rice, G. D. ....St. Cloud  
Gulde, W. C. ....Minneapolis  
Gelz, J. J. ....Richmond  
Glyer, R. T. ....Broton  
Goehrs, H. W. ....St. Cloud  
Hemstad, Werner. ....St. Cloud

Holdridge, Geo. ....Foley  
Kulmann, Aug. ....Melrose  
Lewis, E. J. ....Sauk Center  
Lewis, C. B. ....St. Cloud  
McDowell, J. P. ....St. Cloud  
Moynihan, A. F. ....Sauk Centre  
May, C. E. ....Minneapolis  
McKibben, N. E. ....St. Cloud  
Sherwood, G. E. ....Kimball  
Sutton, Chas. S. ....St. Cloud  
Watson, Tolbert. ....Albany  
Whiting, A. D. ....St. Cloud  
Wolner, Oscar H. ....Gilbert

### Kandiychi-Swift County Medical Society

Regular meetings, third Thursday in March, June, September and December  
Annual meeting, third Thursday in December

President  
Branton, B. J. ....Willmar  
Secretary  
Jacobs, John C. ....Willmar  
Benson, I. S. ....Willmar  
Bergheim, M. C. ....Raymond

Branton, B. J. ....Willmar  
Branton, A. F. ....Willmar  
Daignault, O. ....Benson  
Danison, P. C. ....Willmar  
Ehrenberg, C. J. ....Willmar  
Frost, E. H. ....Willmar

Hanson, H. J. ....New London  
Jacobs, John C. ....Willmar  
Johnson, Hans. ....Kerkhoven  
Kolset, Carl D. ....Benson  
Rains, J. M. ....Willmar  
Scofield, C. L. ....Benson  
Shelver, H. J. ....Ortonville

## FIFTH DISTRICT

COUNCILOR, H. M. WORKMAN, M. D. (2 years) .....Tracy

### Camp Release District Medical Society

Renville, Chippewa, Lac Qui Parle, Sibley counties  
Regular meetings, fourth Thursday in January, April, July and October  
Annual meeting, fourth Thursday in October

President  
Adams, R. C. ....  
Secretary  
Peterson, H. E. ....Granite Falls  
Aldrich, F. H. ....Belview  
Bacon, R. S. ....Montevideo  
Barfield, J. J. ....Granite Falls  
Bergh, L. N. ....Montevideo  
Burns, M. A. ....Milan  
Bushey, M. E. ....Arlington  
Clay, E. M. ....Renville  
Crandall, A. M. ....Madison  
Cress, E. E. ....Boyd  
Cole, H. B. ....Redwood Falls

Eisengraeben, G. A. ....Granite Falls  
Duclos, J. A. ....Henderson  
Duncan, Henry. ....Marietta  
Ferguson, J. B. ....St. Paul  
Flinn, B. P. ....Redwood Falls  
Flinn, T. E. ....Redwood Falls  
Flower, W. Z. ....Minneapolis  
Fritsch, F. P. ....Gibbon  
Guyer, L. A. ....Waseca  
Hauge, M. M. ....Clarksfield  
Holmberg, L. J. ....Canby  
Hovde, Rolf. ....Winthrop  
Johnson, H. M. ....Dawson  
Johnson, C. M. ....Dawson  
Kanne, C. W. ....Fairbault

Lee, Walter N. ....Madison  
Lima, Ludwig. ....Montevideo  
Maercklein, S. R. ....Renville  
Mee, P. H. ....Osseo  
Mesken, G. H. ....Olivia  
Olson, W. P. ....Gaylord  
Passer, A. A. ....Olvia  
Peterson, H. E. ....Granite Falls  
Penhall, F. W. ....Morton  
Puffer, F. L. ....Bird Island  
Stemsrud, A. A. ....Dawson  
Smith, L. G. ....Montevideo  
Walker, G. H. ....Fairfax  
Westby, Nels. ....Madison  
Zimbeck, R. D. ....Maynard

### Redwood-Brown County Medical Society

Regular meeting, June  
Annual meeting, August 10th

President  
Walker, C. C. ....Lamberton  
Secretary  
Meierding, Wm. A. ....Springfield  
Adams, J. L. ....Morgan  
Eckstein, A. W. ....Comfrev  
Gray, F. D. ....Marshall

Haskins, John L. ....Morgan  
Jamieson, Earl. ....Walnut Grove  
Meierding, Wm. A. ....Springfield  
Pelant, F. J. ....New Ulm  
Perkins, J. ....Sanborn  
Peterson, R. A. ....Vesta  
Rothenburg, J. C. ....Springfield

Schoch, J. L. ....New Ulm  
Shrader, J. S. ....Springfield  
Strickler, A. F. ....Sleepy Eye  
Strickler, Mary. ....Sleepy Eye  
Sundt, M. ....Minneapolis  
Walker, C. C. ....Lamberton  
Weiser, Geo. ....New Ulm

### Lyon-Lincoln County Medical Society

Regular meetings, first Tuesday in March, May and July  
Annual meeting, October

President  
Germo, Chas. ....Balator  
Secretary  
Workman, H. M. ....Tracy  
Bacon, C. G. ....Marshall  
Bossingham, O. N. ....Lake Benton

Engh, Sigfred. ....Cottonwood  
Germo, Chas. ....Balator  
Hall, E. L. ....Russell  
Holdale, A. D. ....Tracy  
Jacquoat, G. L. ....Ivanhoe  
Jensen, J. C. ....Hendricks  
Persons, C. E. ....Marshall

Robertson, J. B. ....Cottonwood  
Sanderson, E. G. ....Minneota  
Thorardson, Theo. ....Minneota  
Vadheim, A. L. ....Tyler  
Valentine, W. H. ....Tracy  
Workman, H. M. ....Tracy  
Workman, W. C. ....Tracy

## SIXTH DISTRICT

COUNCILOR, F. R. WEISER, (1 year).....Windom

### Southwestern Minnesota Medical Society

Pipestone, Rock, Murrey, Nobels, Cottonwood, Jackson counties

Regular meeting, May 12th  
Annual meeting, November 10th

President  
Watson, F. G.....Worthington

Secretary  
McKeown, E. G.....Pipestone  
Atkins, G. L.....Jackson  
Arnold, E. W.....Adrian  
Balcom, G. G.....Lake Wilson  
Bang, J. H.....Jasper  
Brown, A. H.....Pipestone  
Chadbourne, A. G.....Heron Lake  
Cress, P. J.....Ellsworth  
De Boer, Hermanus.....Edgerton  
Dolan, C. P.....Worthington  
Doms, H. C.....Slayton  
Ditmeyer, L. M. Gerber.....Jasper  
Dudley, J. H.....Windom  
Goldberg, M. L.....Jasper

Golden, C. M.....Tyler  
Hitchings, W. P.....Lakefield  
Hilger, J. M.....Iona  
Jenckes, H. D.....Pipestone  
Keeling, F. L.....Lakefield  
Knudtson, H. M.....Pipestone  
Leigh, H. J.....Lakefield  
Lowe, Thos. A.....Pipestone  
Lowe, Thos. A.....Pipestone  
McCrea, James.....Fulda  
McIntyre, John A.....Round Lake  
McKeown, E. G.....Pipestone  
Manson, F. M.....Worthington  
May, C. C.....Adrian  
Metcalf, F. W.....Fulda  
Mark, B. O.....Worthington  
Patterson, W. E.....Westbrook  
Piper, Wm. A.....Mountain Lake

Ravu, B.....Windom  
Richardson, W. E.....Pipestone  
Richmond, Chas. D.....Jeffers  
Rose, J. T.....Lakefield  
Stanley, C. R.....Worthington  
Sherman, C. L.....Luverne  
Smallwood, J. T.....Worthington  
Slater, S. A.....Worthington  
Sogge, L.....Windom  
Taylor, Wm. J.....Pipestone  
Thoreson, E. O.....Luverne  
Tiedeman, I. D.....Adrian  
Tofte, Josephine.....Pine City  
Waller, Jas. D.....Wilmont  
Watson, F. G.....Worthington  
Weiser, F. R.....Windom  
Williams, A. L.....Slayton  
Wright, C. O.....Luverne

### Blue Earth Valley Medical Society

Martin and Faribault counties

Regular meetings, May and October  
Annual meeting, May 26, 1921

President  
Broberg, J. A.....Blue Earth

Secretary  
Hunt, R. C.....Fairmont  
Bailey, H. B.....Ceylon  
Broberg, J. A.....Blue Earth  
Butz, J. A.....Monterey  
Cooper, M. D.....Winnebago City

Chambers, W. C.....Blue Earth  
Dewey, G. W.....Fairmont  
Farrage, J. H.....Winnebago City  
Gough, W. H.....Granada  
Henderson, A. G.....Kiester  
Hohn, P. F.....Wells  
Hunt, F. N.....Fairmont  
Hunt, R. C.....Fairmont  
Hunte, A. F.....Truman

Jacobs, A. C.....Elmore  
Johnson, H. P.....Fairmont  
Luedtke, G. H.....Fairmont  
Logan, F. W.....Blue Earth  
McGroarty, J. J.....Easton  
Richardson, W. J.....Fairmont  
Stroble, W. G.....Welcome  
Sybilrud, H. W.....Bricelyn  
Wilson, C. E.....Blue Earth

### Watsonwan County Medical Society

Annual meeting, December

President  
Thompson, Albert.....St. James  
Secretary  
Hodapp, R. J.....Madelia

Grimes, A. B.....Madelia  
Hogen, O. E.....Butterfield  
Hodapp, R. J.....Madelia  
Haynes, B. H.....St. James

Kabrick, O. A.....Odin  
McCarthy, W. J.....Madelia  
Rowe, W. H.....St. James  
Thompson, Albert.....St. James

## SEVENTH DISTRICT

COUNCILOR, F. A. DODGE, M. D. (1 year).....Le Sueur

### Nicollet-Le Sueur County Medical Society

Regular meetings, September and December  
Annual meeting, second Tuesday in December

President  
Covell, W. W.....St. Peter

Secretary  
Le Clerc, J. E.....Le Sueur  
Aitkins, H. B.....Le Sueur Center  
Baskett, Geo. T.....St. Peter

Baskett, Olive T.....St. Peter  
Covell, W. W.....St. Peter  
Covey, Herman.....Knoxvill, Iowa  
Daniels, J. W.....St. Peter  
Dodge, F. A.....Le Sueur  
Eirley, Clara.....Mt. Pleasant, Ia.  
Freeman, Geo. H.....Willmar  
Hartung, H. A.....Le Sueur

Le Clerc, J. E.....Le Sueur  
McDougald, D. W.....Le Sueur  
Mellicke, W. W.....Nicollet  
Merritt, G. F.....St. Peter  
Olson, R. G.....Minneapolis  
Phelps, R. M.....St. Peter  
Strothern, F. P.....St. Peter  
Woodworth, L. F.....Le Sueur Center

### McLeod County Medical Society

Regular meetings, January, April, July and October  
Annual meeting, January

President  
Clement, J. B.....Lester Prairie

Secretary  
Maurer, E. L.....Brownton

Bolles, D. W.....Galveston, Tex.  
Barrett, E. E.....Glencoe  
Clement, J. B.....Lester Prairie  
Jellison, E. R.....New Auburn

Kohler, F. G.....Hector  
Maurer, E. L.....Brownton  
Sheppard, Fred.....Hutchinson  
Sheppard, P. E.....Hutchinson  
Tinker, C. W.....Stewart

### Scott-Carver Medical Society

Regular meetings, first Thursday in March, June, September and December  
Annual meeting, first Thursday in December

President  
Bohland, F. J.....Belle Plaine

Secretary  
Reiter, H. W.....Shakopee  
Bohland, F. J.....Belle Plaine

Buck, Fred H.....Shakopee  
Cannady, E. E.....Prior Lake  
Fischer, H. P.....Shakopee  
Henriksen, H. G.....New Market  
Landenberger, John.....New Prague  
Maertz, W. F.....New Prague

Moloney, G. R.....Belle Plaine  
Mulder, John L.....Chaska  
Novak, E. E.....New Prague  
Reiter, H. W.....Shakopee  
Schneider, H. A.....Jordan  
White, J. B.....Belle Plaine



### Goodhue County Medical Society

Regular meetings, January 12th and August 15th  
Annual meeting, January 10th, 1921

President  
Conley, Alva A.....Cannon Falls

Secretary  
Werner, N. L.....Red Wing  
Anderson, J. V.....Red Wing

Aanes, A. M.....Red Wing  
Clayden, L. E.....Red Wing  
Conley, Alva A.....Cannon Falls  
Conley, H. E.....Cannon Falls  
Cremer, M. H.....Red Wing  
Gates, J. A.....Kenyon

Johnson, A. E.....Red Wing  
Jones, A. W.....Red Wing  
McGuigan, H. T.....Red Wing  
Sawyer, P.....Goodhue  
Smith, M. W.....Red Wing  
Werner, N. L.....Red Wing

### Rice County Medical Society

Regular meeting, first Wednesday, January, April, July and October  
Annual meeting, first Wednesday in January

President  
Wilson, Warren.....Northfield

Secretary  
Mayland, M. L.....Faribault  
Babcock, F. M.....Northfield  
Davis, F. U.....Faribault  
Fields, Merton.....Northfield  
Haessley, S. B.....Faribault

Hanson, A. M.....Faribault  
Hunt, W. A.....Northfield  
Huxley, F. R.....Faribault  
Lane, Laura A.....Faribault  
Lee, W. P.....Northfield  
Lexa, F. J.....Lonsdale  
Mayland, M. L.....Faribault  
Morse, W. E. H.....Morristown  
Phillips, J. G.....Northfield

Plonski, C. J.....Faribault  
Robilliard, C. M.....Faribault  
Robilliard, W. H.....Faribault  
Rumph, W. H.....Faribault  
Smith, P. A.....Faribault  
Theissen, W. H.....Faribault  
Traeger, C. A.....Faribault  
Warren, F. S.....Faribault  
Wilson, Warren.....Northfield

### Wabasha County Medical Society

Regular meetings, annually first Thursday after first Monday in July

President  
Heagerty, W. B.....Mazeppa

Secretary  
Wilson, W. F.....Lake City  
Bayley, E. H.....Lake City

Bowers, J. T.....Lake City  
Bowers, H. E.....Lake City  
Branyan, Hugo.....Wabasha  
Dempsey, D. P.....Kellogg  
Fleischhauer, D. S.....Wabasha  
Heagerty, W. B.....Mazeppa

Radabaugh, R. C.....Hastings  
Rankin, A. A.....Zumbro Falls  
Replogle, W. H.....Wabasha  
Schmidt, G.....Lake City  
Slocumb, J. A.....Plainview  
Wilson, W. F.....Lake City

## EIGHTH DISTRICT

COUNCILOR, W. F. BRAASCH, M. D. (2 years).....Rochester

### Blue Earth County Medical Society

Regular meetings, first Wednesday, January, April, July and October  
Annual meeting, December

President  
Snell, Albert N.....Mankato

Secretary  
Liedloff, A. G.....Mankato  
Andrews, J. W.....Mankato  
Andrews, R. N.....Mankato  
Benhan, E. W.....Mankato  
Black, Wm.....Mankato  
Dahl, G. A.....Mankato  
Denman, A. V.....Mankato

Edwards, Ralph.....Elysian  
Franchere, F. W.....Lake Crystal  
Holman, C. J.....Mankato  
Holbrook, J. S.....Mankato  
James, J. H.....Mankato  
Kemp, A. F.....Mankato  
Lloyd, H. J.....Mankato  
Liedloff, A. G.....Mankato  
Miller, V. L.....Mankato  
Merrill, J. E.....Amboy

Osborn, Lida.....Mankato  
Pratt, C. C.....Mankato  
Sohmer, A. E.....Mankato  
Schmitt, A. F.....Mankato  
Snell, Albert N.....Mankato  
Schlesselman, J. T.....Mankato  
Wentworth, A. J.....Mankato  
Williams, Hugh O.....Lake Crystal  
Williams, John.....Lake Crystal

### Houston-Fillmore County Medical Society

No regular meetings  
Annual meeting, October

President  
Helland, G. M.....Spring Grove

Secretary  
Fischer, O. F.....Houston  
Anderson, Norman E.....Harmony  
Browning, W. E.....Caledonia  
Collins, J. S.....Caledonia  
Drake, F. A.....Lanesboro

Eby, C. B.....Spring Valley  
Fischer, O. F.....Houston  
Foster, Bainbridge.....Spring Valley  
Helland, G. M.....Spring Grove  
Helland, J. W.....Spring Grove  
Kibbe, O. A.....Canton  
Kierland, P. E.....Harmony  
Lannin, J. C.....Mabel  
Lommen, A. P.....Lanesboro  
Love, Geo. A.....Preston

Nelson, M. S.....Spring Grove  
Nass, H. A.....Mabel  
Onsgard, C. K.....Halstad  
Onsgard, L. K.....Houston  
Rhines, D. C.....Caledonia  
Sather, E. R.....Spring Valley  
Tierney, C. M.....Granger  
Utey, J. D.....Minneapolis  
Williams.....Rushford  
Woodruff, C. W.....Chatfield

### Mower County Medical Society

Regular meetings, second Wednesday in January, April, July and October  
Annual meeting, second Wednesday in October

President  
Grise, W. B.....Austin

Secretary  
Baker, G. L.....Austin  
Allen, A. W.....Austin  
Allen, Chas. C.....Austin  
Baker, G. L.....Austin  
Cobb, W. F.....Northfield  
Coleman, F. B.....Austin  
Grise, W. B.....Austin

Hart, M. J.....Le Roy  
Hegge, C. A.....Austin  
Hegge, O. H.....Austin  
Henslin, A. E.....Le Roy  
Hertel, G. E.....Austin  
Havens, John G. W.....Austin  
Lewis, Chas. F.....Austin  
Leck, Clifford C.....Austin  
Lommen, P. A.....Austin  
McKenna, J. C.....Austin

Melzer, R. G.....Lyle  
Mitchell, R. S.....Grand Meadow  
Moore, W. J.....Adams  
Morse, M. P.....Le Roy  
Morris, E. H.....Austin  
Pierson, Homer F.....Austin  
Rebman, E. C.....Austin  
Shottler, G. J.....Dexter  
Torkelson, P. T.....Lyle  
Warren, C. L.....Le Roy

### Dodge County Medical Society

No regular meetings  
Annual meeting, second Wednesday in August

President  
Baker, H. R. .... Hayfield  
Secretary  
Bigelow, C. E. .... Dodge Center

Adams, R. T. .... Mantorville  
Baker, A. L. .... Kasson  
Beet, W. E. .... Dodge Center  
Bigelow, C. E. .... Dodge Center

Clifford, F. F. .... West Concord  
Harrison, E. E. .... West Concord  
Smith, F. D. .... Kasson  
Way, O. L. .... Claremont

### Olmstead County Medical Society

Regular meetings, second Wednesday, April, June, September and December  
Annual meeting, second Wednesday in December

President  
Pollock, L. W. .... Rochester  
Allen, W. A. .... Rochester  
Adson, A. W. .... Rochester  
Asbury, J. T. .... Chatfield  
Bissell, W. W. .... Rochester  
Bleifus, W. F. .... Rochester  
Barlow, R. A. .... Rochester  
Balfour, D. C. .... Rochester  
Benedict, W. L. .... Rochester  
Berkman, D. M. .... Rochester  
Bowling, H. H. .... Rochester  
Braasch, W. F. .... Rochester  
Broders, A. C. .... Rochester  
Buie, L. A. .... Rochester  
Bumpus, H. C. .... Rochester  
Connor, H. M. .... Rochester  
Grenshaw, J. L. .... Rochester  
Crewe, J. E. .... Rochester  
Dolder, F. C. .... Eyota  
Eusterman, G. B. .... Rochester  
Everts, Arah B. .... Rochester  
Fawcett, C. E. .... Stewartville  
Gamble, J. W. .... Rochester  
Giffin, H. Z. .... Rochester  
Granger, C. T. .... Rochester

Goekerman, W. H. .... Rochester  
Granger, S. Booker. .... Rochester  
Graham, C. .... Rochester  
Hallenbeck, D. F. .... Rochester  
Hartman, H. R. .... Rochester  
Hayes, J. M. .... Rochester  
Hollberg, C. A. .... Rochester  
Hedblom, C. A. .... Rochester  
Henderson, M. S. .... Rochester  
Heyerdale, O. C. .... Rochester  
Howard, S. E. .... Rochester  
Huffman, R. W. .... Elgin  
Hunt, V. C. .... Rochester  
Joyce, G. T. .... Rochester  
Judd, E. S. .... Rochester  
Kilbourne, A. F. .... Rochester  
King, C. P. .... Rochester  
Lillie, W. F. .... Rochester  
Lillie, H. L. .... Rochester  
Lemon, W. S. .... Rochester  
Linton, W. B. .... Rochester  
Logan, A. H. .... Rochester  
Lyon, H. R. .... Rochester  
Mostin, E. V. .... Rochester  
Masson, J. C. .... Rochester  
Mayo, C. H. .... Rochester  
Mayo, W. J. .... Rochester  
Melson, O. C. .... Rochester  
Meyerding, H. W. .... Rochester

Moore, A. B. .... Rochester  
Muehlig, G. F. .... Rochester  
Mussey, R. D. .... Rochester  
New, G. B. .... Rochester  
O'Leary, P. A. .... Rochester  
Ohlinger, L. B. .... Rochester  
Pemberton, J. de J. .... Rochester  
Piper, M. C. .... Rochester  
Plummer, H. S. .... Rochester  
Plummer, W. A. .... Rochester  
Pollock, L. W. .... Rochester  
Prangen, A. D. .... Rochester  
Rosenow, E. C. .... Rochester  
Russell, H. R. .... Stewartville  
Sanford, A. H. .... Rochester  
Sheldon, W. D. .... Rochester  
Sistrunk, W. E. .... Rochester  
Smith, F. L. .... Rochester  
Stacey, L. J. .... Rochester  
Steven, Geo. .... Byron  
Stokes, J. H. .... Rochester  
Sutton, G. E. .... Rochester  
Szlapka, T. J. .... Rochester  
Vinson, P. P. .... Rochester  
Witherstone, H. H. .... Rochester  
Wilder, R. M. .... Rochester  
Willius, F. A. .... Rochester  
Wilson, L. B. .... Rochester  
Woltman, H. W. .... Rochester

### Waseca County Medical Society

Annual meeting, December 10th, 1921

President  
Chamberlain, W. A. .... Waseca  
Secretary  
Miller, H. A. .... Waseca

Chamberlain, W. A. .... Waseca  
Cory, W. .... Waterville  
Hagen, H. O. .... New Richland  
Lynn, J. F. .... Waseca

McIntire, H. M. .... Waseca  
Joyce, T. M. .... Janesville  
Miller, H. A. .... Waseca  
O'Hara, J. J. .... Jaynesville  
Swartwood, F. A. .... Waseca

### Winona County Medical Society

Regular meetings, first Tuesday, January, April, July, October  
Annual meeting in January

President  
Rosenberry, B. P. .... Winona  
Secretary  
Robbins, C. P. .... Winona  
Bear, H. C. .... St. Charles, Minn.  
Benoit, T. F. .... Winona  
Clay, F. H. .... St. Charles  
Heisi, W. F. C. .... Winona

Keyes, E. D. .... Winona  
Leicht, O. .... Winona  
Lester, C. A. .... Winona  
Leichtenstein, H. .... Winona  
Lindsay, W. V. .... Winona  
Lynch, J. L. .... Winona  
McLaughlin, E. M. .... Winona  
Nauth, W. W. .... Winona  
Neuman, C. A. .... Lewiston

Neuman, W. A. .... Lewiston  
Prichard, D. B. .... Winona  
Robbins, C. P. .... Winona  
Rollins, F. H. .... St. Charles  
Rosenberry, B. P. .... Winona  
Steiner, I. W. .... Winona  
Schaffer, S. .... Winona  
Scott, F. W. .... St. Charles  
Tweedy, G. .... Winona

### Freeborn County Medical Society

Regular meetings upon call of members  
Annual meeting, November

President  
Von Berg, J. P. .... Albert Lea  
Secretary  
Schultz, J. A. .... Albert Lea  
Bessesen, W. A. .... Minneapolis  
Burns, H. D. .... Albert Lea

Butturff, C. R. .... Freeborn  
Calhoun, F. W. .... Albert Lea  
Folken, F. G. .... Albert Lea  
Freeman, J. P. .... Glenville  
Gullixon, A. .... Albert Lea  
Kamp, B. A. .... Albert Lea

Nannestad, J. R. .... Albert Lea  
Palmer, W. L. .... Albert Lea  
Schultz, J. A. .... Albert Lea  
Stevenson, R. G. .... Albert Lea  
Vollum, E. O. .... Albert Lea  
Von Berg, J. P. .... Albert Lea

### Steele County Medical Society

Regular meetings, first Tuesday of each month  
Annual meeting in December

President  
E. W. Senn. .... Owatonna  
Secretary  
Andrist, J. W. .... Owatonna  
Adair, J. H. .... Owatonna  
Andrist, J. W. .... Owatonna

Daily, W. J. .... Blooming Prairie  
Ertel, E. Q. .... Ellendale  
Hart, A. B. .... Owatonna  
Morehouse, G. G. .... Owatonna  
Melby, Benedict. .... Blooming Prairie  
Peterson, Christian. .... Owatonna

Smersh, F. M. .... Owatonna  
Smersh, J. F. .... Owatonna  
Senn, E. W. .... Owatonna  
Stewart, A. B. .... Owatonna  
Thimsen, N. C. .... Blooming Prairie  
Warren, J. W. .... Minneapolis



# ALPHABETICAL ROSTER

Aanes, A. M.....Red Wing  
 Abbott, S. W.....Minneapolis  
 Abbott, J. S.....St. Paul  
 Abbott, Wm. P.....Duluth  
 Aborn, W. H.....Hawley  
 Abramovich, J. H.....St. Paul  
 Adair, F. L.....Minneapolis  
 Adair, J. H.....Owatonna  
 Adams, B. S.....Hibbing  
 Adams, J. L.....Morgan  
 Adams, R. C.....Bird Island  
 Adams, R. T.....Mantorville  
 Adkins, C. M.....Thief River Falls  
 Adson, A. W.....Rochester  
 Ahrens, A. E.....St. Paul  
 Ahrens, A. H.....St. Paul  
 Aitkens, H. B.....Le Sueur Center  
 Aldrich, F. H.....Belview  
 Allen, A. W.....Austin  
 Allen, Chas C.....Austin  
 Allen, F. H.....Staples  
 Allen, H. W.....Minneapolis  
 Alden, J. T.....St. Paul  
 Aldes, Harry.....St. Paul  
 Alexander, F. H.....St. Paul  
 Allen, Mason.....St. Paul  
 Allen, W. A.....Rochester  
 Ancker, A. B.....St. Paul  
 Anderson, A. E.....Minneapolis  
 Anderson, A. G.....Minneapolis  
 Anderson, C. A.....Rush City  
 Anderson, J. D.....Minneapolis  
 Anderson, J. V.....Red Wing  
 Anderson, Norman E.....Harmony  
 Andrews, J. W.....Mankato  
 Andrews, R. N.....Mankato  
 Annis, H. B.....Minneapolis  
 Andrist, J. W.....Owatonna  
 Archibald, F. M.....Mahnomen  
 Arends, A. L.....St. Paul  
 Armstrong, J. M.....St. Paul  
 Arouni, Khalil.....St. Paul  
 Arey, H. C.....Excelsior  
 Arminen, K. V.....Duluth  
 Arnold, E. W.....Adrian  
 Arzt, C. P.....St. Paul  
 Ashbury, J. T.....Chatfield  
 Atkins, G. L.....Jackson  
 Aune, Martin.....Minneapolis  
 Aurand, W. H.....Minneapolis  
 Ausman, C. F.....Paynesville  
 Austin, E. E.....Minneapolis  
 Ayres, C. T.....Ely  
 Aylmer, A. L.....Minneapolis

Babcock, F. M.....Northfield  
 Bacon, C. G.....Marshall  
 Bacon, H. P.....Milaca  
 Bacon, L. C.....St. Paul  
 Bacon, Knox.....St. Paul  
 Bacon, R. S.....Montevideo  
 Badeaux, G. I.....Brainerd  
 Bagley, W. R.....Duluth  
 Bailey, H. B.....Ceylon  
 Baker, A. C.....Fergus Falls  
 Baker, A. I.....Kasson  
 Baker, E. L.....Minneapolis  
 Baker, G. L.....Austin  
 Baker, H. A.....Minneapolis  
 Baker, Looe.....Minneapolis  
 Balcom, G. G.....Lake Wilson  
 Balcome, F. E.....St. Paul  
 Baldwin, L. B.....Minneapolis  
 Balfour, R. A.....Rochester  
 Ball, C. R.....St. Paul  
 Bank, Harry E.....Minneapolis  
 Barfield, J. J.....Granite Falls  
 Barlow, R. A.....Rochester  
 Barney, L. A.....Duluth  
 Barr, W. H.....Wells  
 Barrett, E. E.....Glencoe  
 Barron, Moses.....Minneapolis  
 Barry, L. W.....St. Paul  
 Barsness, Nellie.....St. Paul  
 Barton, Edgar R.....Minneapolis  
 Baskett, George T.....St. Peter  
 Baskett, Olive T.....St. Peter  
 Baxter, S. H.....Minneapolis  
 Bayley, E. H.....Lake City  
 Beach, Geo. Wm.....Dayton, Ohio  
 Beadle, W. D.....St. Paul  
 Beals, Hugh.....St. Paul  
 Bear, H. C.....St. Charles  
 Beard, Archie H.....Minneapolis

Beaty, J. H.....St. Cloud  
 Beaudoux, Henry A.....Minneapolis  
 Beckley, F. L.....St. Paul  
 Beebe, W. L.....St. Cloud  
 Beiderman, Jacob.....Thief River Falls  
 Beise, R. A.....Brainerd  
 Bell, J. W.....Minneapolis  
 Bell, J. W. Jr.....Minneapolis  
 Belt, W. E.....Dodge Center  
 Benedict, E. E.....Minneapolis  
 Benedict, W. L.....Rochester  
 Benepe, L. M.....St. Paul  
 Benhan, E. W.....Mankato  
 Benjamin, A. E.....Minneapolis  
 Benn, F. G.....Minneapolis  
 Bennion, P. H.....St. Paul  
 Benot, T. F.....Winona  
 Benson, Geo. E.....Minneapolis  
 Benson, I. S.....Willmar  
 Bentley, Norman P.....St. Paul  
 Berghelm, M. C.....Raymond  
 Bergh, L. N.....Montevideo  
 Berquist, K. E.....Duluth  
 Bertelson, O. L.....Crookston  
 Berkman, D. M.....Rochester  
 Berrisford, Paul D.....St. Paul  
 Bessesen, A. M.....Minneapolis  
 Bessesen, W. A.....Minneapolis  
 Bettingen, J. W.....St. Paul  
 Bigelow, C. E.....Dodge Center  
 Binger, H. E.....St. Paul  
 Binet, H. E.....Grand Rapids  
 Birnberg, T. L.....St. Paul  
 Bishop, Chas. W.....Minneapolis  
 Bissell, Chas. W.....Minneapolis  
 Bissell, W. W.....Rochester  
 Black, Wm.....Mankato  
 Blake, Jas.....Hopkins  
 Blakely, C. C.....Barnum  
 Bleifus, W. T.....Rochester  
 Blegen, H. M.....Warren  
 Bock, R. A.....St. Paul  
 Bockman, M.....Minneapolis  
 Boeckmann, Edward.....St. Paul  
 Boeckmann, Egil.....St. Paul  
 Boehm, J. C.....St. Cloud  
 Bohland, E. H.....St. Paul  
 Bohland, F. J.....Belle Plaine  
 Bohling, B. S.....Sandstone  
 Bole, R. S.....St. Paul  
 Boleyn, E. S.....Stillwater  
 Bolles, D. W.....Galveston, Texas  
 Bolsta, Chas.....Ortonville  
 Bolstad, H. C.....St. Paul  
 Bone, Merle.....Kelliher  
 Booth, A. E.....Minneapolis  
 Boquist, E. T. W.....Minneapolis  
 Borreen, C. A.....Minneapolis  
 Borreson, B.....Bemidji  
 Brossingham, O. N.....Lake Benton  
 Bosworth, Robinson.....St. Paul  
 Bouthellson, B. I.....Moorhead  
 Bouman, H. A.....Minneapolis  
 Bowing, H. H.....Rochester  
 Boyer, S. H.....Duluth  
 Boyesen, P.....Pelican Rapids  
 Bowers, J. T.....Lake City  
 Bowers, H. E.....Lake City  
 Brabec, F. J.....Perham  
 Braden, A. J.....Duluth  
 Branton, A. F.....Willmar  
 Branton, B. J.....Willmar  
 Branyan, Hugo.....Wabasha  
 Bratrud, A. E.....Minneapolis  
 Bratrud, O. Edward.....Warren  
 Bratrud, Theodor.....Warren  
 Brand, G. D.....St. Paul  
 Bray, C. W.....Biwabik  
 Bray, E. R.....St. Paul  
 Brigham, C. F.....St. Cloud  
 Brigham, Frank.....Eden Valley  
 Brimhall, J. B.....St. Paul  
 Broberg, J. A.....Blue Earth  
 Broders, A. C.....Rochester  
 Brodie, Walter D.....St. Paul  
 Broker, W. S.....Battle Lake  
 Brooks, Chas. N.....Minneapolis  
 Brooks, D. F.....St. Paul  
 Brooks, G. F.....Minneapolis  
 Broosch, W. F.....Rochester  
 Brown, A. H.....Pipestone  
 Brown, Edgar D.....Minneapolis  
 Brown, Ed. I.....St. Paul  
 Brown, John C.....St. Paul

Brown, LeRoy.....St. Paul  
 Brown, Paul F.....Minneapolis  
 Brown, R. S.....Minneapolis  
 Brown, Silas E.....St. Paul  
 Browning, W. E.....Caledonia  
 Brunet, L. M.....Cloquet  
 Buck, Fred. H.....Shakopee  
 Buckley, E. W.....St. Paul  
 Buie, L. A.....Rochester  
 Bullen, F. W.....Hibbing  
 Bumpus, H. C.....Rochester  
 Burch, F. E.....St. Paul  
 Burfiend, G. H.....St. Paul  
 Burnap, W. L.....Fergus Falls  
 Burns, F. W.....St. Paul  
 Burns, H. D.....Albert Lea  
 Burns, M. A.....Milan  
 Burns, R. M.....St. Paul  
 Buscher, H.....St. Paul  
 Bushey, M. E.....Arlington  
 Butler, John.....Minneapolis  
 Button, A. J.....Hackensack  
 Butturff, C. R.....Freeborn  
 Butz, J. A.....Monterey  
 Byrnes, W. J.....Minneapolis

Cabot, V. S.....Minneapolis  
 Caine, C. E.....Morris  
 Caldwell, J. M.....Brainerd  
 Calhoun, F. W.....Albert Lea  
 Cameron, J. A.....St. Paul  
 Camp, W. E.....Minneapolis  
 Campbell, A. A.....Ogema  
 Campbell, D. R.....Bagley  
 Campbell, E. Paul.....St. Paul  
 Campbell, J. E.....South St. Paul  
 Campbell, L. M.....Minneapolis  
 Cannady, E. E.....Prior Lake  
 Cannon, C. N.....St. Paul  
 Cannon, Harry.....St. Paul  
 Carlow, C. M.....Minneapolis  
 Carman, C. L.....St. Paul  
 Carman, Paul I.....St. Paul  
 Carroll, Wm. C.....St. Paul  
 Carstons, C. F.....Hibbing  
 Catlin, John J.....Buffalo  
 Catlin, T. J.....Palisade  
 Cavanaugh, J. O.....St. Paul  
 Cavanor, F. T.....Minneapolis  
 Chadbourne, A. G.....Heron Lake  
 Chambers, W. C.....Blue Earth  
 Chamberlain, J. W.....St. Paul  
 Chamberlain, W. A.....Waseca  
 Chapman, T. L.....Duluth  
 Chapman, W. E.....Litchfield  
 Chatterton, C. C.....St. Paul  
 Cheleen, S. J.....Minneapolis  
 Cheney, E. L.....Duluth  
 Christenson, C. R.....Morris  
 Christiansen, A.....St. Paul  
 Christie, G. R.....Long Prairie  
 Cirkler, A. A.....Minneapolis  
 Clark, C. N.....Greenbush  
 Clark, F. F.....Duluth  
 Clark, G. E.....Stillwater  
 Clark, H. B.....St. Cloud  
 Clark, H. S.....Minneapolis  
 Clark, Lenna E.....Greenbush  
 Clark, T. C.....Minneapolis  
 Clay, E. M.....Renville  
 Clayden, L. E.....Red Wing  
 Clement, J. B.....Lester Prairie  
 Clifford, C. E.....West Concord  
 Clifton, Geo. A.....Isanti  
 Cobb, S. G.....St. Paul  
 Cockrane, W. M.....Minneapolis  
 Cole, H. B.....Redwood Falls  
 Cole, Wallace H.....St. Paul  
 Coleman, F. B.....Austin  
 Collie, H. G.....Brainerd  
 Collins, A. N.....Duluth  
 Collins, H. C.....Duluth  
 Collins, J. S.....Caledonia  
 Colvin, A. R.....St. Paul  
 Comstock, A. E.....St. Paul  
 Condit, W. H.....Minneapolis  
 Conheim, Eva.....St. Paul  
 Conkey, C. D.....Duluth  
 Conley, Alva A.....Cannon Falls  
 Conley, H. E.....Cannon Falls  
 Connor, C. E.....St. Paul  
 Connor, H. M.....Rochester  
 Cook, Paul B.....St. Paul  
 Cooney, H. C.....Princeton

Cooper, M. D.....Winnebago City  
Corbett, Frank J.....Minneapolis  
Corniea, A. D.....St. Paul  
Corrigan, J. E.....Spooner  
Cory, W. H.....Waterville  
Cosgrove, J. H.....Duluth  
Cosman, E. O.....Minneapolis  
Cowern, E. W.....North St. Paul  
Courtney, Walter.....Brainerd  
Covell, W. W.....St. Peter  
Coventry, W. A.....Duluth  
Covey, Herman.....Knoxville, Ia.  
Cowing, P. G.....Evansville  
Craft, Leo M.....Minneapolis  
Craig, C. E.....International Falls  
Crandall, A. M.....Madison  
Cranmer, Richard R.....Minneapolis  
Cremer, M. H.....Red Wing  
Crenshaw, J. L.....Rochester  
Cress, P. J.....Ellsworth  
Crewe, J. E.....Rochester  
Cress, E. E.....Boyd  
Crowe, J. H.....Virginia  
Crume, Geo. P.....Minneapolis  
Cuts, G. A. C.....Litchfield

Dahl, G. A.....Mankato  
Dahlstrom, A. W.....Barrett  
Dack, Lloyd G.....St. Paul  
Dahl, John A.....Minneapolis  
Daigault, O.....Benson  
Daily, W. J.....Blooming Prairie  
Dampier, C. E.....Crookston  
Daniels, J. W.....St. Peter  
Daniels, W. H.....Crookston  
Danielson, K. A.....Litchfield  
Darling, J. B.....St. Paul  
Darrow, D. C.....Moorhead  
Dart, Leslie O.....Minneapolis  
Daugherty, E. B.....St. Paul  
Daugherty, L. E.....St. Paul  
Davis, B. J.....Duluth  
Davis, Herbert.....St. Paul  
Davis, F. U.....Faribault  
Davis, H. S.....Duluth  
Davis, William.....St. Paul  
Davison, P. C.....Willmar  
DeBoer, Hermanus.....Edgerton  
Dedolph, Karl.....St. Paul  
Delmore, J. L.....Roseau  
Dempsey, D. P.....Kellogg  
Denman, A. V.....Mankato  
Dennis, W. A.....St. Paul  
Deslauriers, A. A.....Duluth  
Desley, G. W.....Fairmont  
Deziel, G.....Minneapolis  
Dickson, Thos. H. Jr.....St. Paul  
Disen, C. F.....Minneapolis  
Ditmeyer, L. M. Gerber.....Jasper  
Dittman, Geo. C.....St. Paul  
Dodge, F. A.....Le Sueur  
Dohm, A. J.....St. Paul  
Dolan, C. P.....Worthington  
Dolder, F. C.....Eyota  
Doms, H. C.....Slayton  
Donaldson, C. A.....Minneapolis  
Donovan, J. J.....Litchfield  
Doolittle, L. E.....Duluth  
Douglass, H. E.....Blackduck  
Doyle, John Willie.....Hill City  
Doxey, G. L.....Minneapolis  
Drake, Carl B.....St. Paul  
Drake, C. R.....Minneapolis  
Drake, F. A.....Lanesboro  
Dredge, H. P.....Sandstone  
Drenning, F. C.....Duluth  
Driesbach, N.....Minneapolis  
Drought, W. W.....Fergus Falls  
Dryden, F. M.....Crookston  
DuBois, J. A.....Sauk Center  
Du Bois, J. F.....Sauk Center  
Dudley, J. H.....Windom  
Dulude, S.....Dassel  
Dunlop, Alex.....Crookston  
Duncan, Henry.....Marietta  
Dunn, J. N.....St. Paul  
Duclos, J. A.....Henderson  
Dunn, Louis.....Minneapolis  
Dunsmoor, F. A.....Minneapolis  
Durgin, F. L.....Nopeming

Earl, George A.....St. Paul  
Earl, Robert C.....St. Paul  
Eberlin, E. A.....Glenwood  
Eby, C. B.....Spring Valley  
Eckstein, A. W.....Comfrey  
Edmunds, I. L.....Clearwater  
Edwards, Ralph C.....Elysian

Egan, John M.....Minneapolis  
Ehmke, Wm. E.....Willow River  
Ehrenberg, C. J.....Willmar  
Eisengraeben, G. A.....Granite Falls  
Eissenman, W. G.....Chisholm  
Elrley, Clara.....Mt. Pleasant, Ia.  
Eitel, G. G.....Minneapolis  
Ekblad, J. W.....Duluth  
Eklund, J. J.....Duluth  
Eklund, Wm. J.....Duluth  
Elias, F. J.....Duluth  
Ellison, Frank E.....Monticello  
Ely, O. S.....So. St. Paul  
Engberg, E. J.....St. Paul  
Engh, Sigfred.....Cottonwood  
Erb, F. A.....Minneapolis  
Erickson, J. G.....Minneapolis  
Ernest, G. C.....St. Paul  
Ertel, E. Q.....Ellendale  
Eshelby, E. C.....St. Paul  
Esser, John.....Perham  
Estrem, C. O.....Fergus Falls  
Eusterman, G. B.....Rochester  
Evarts, Arah B.....Rochester  
Evert, J. A.....Brainerd  
Ewing, C. F.....Wheaton

Fahey, E. W.....Duluth  
Fansler, W. A.....Minneapolis  
Farmer, J. C.....McKinley  
Farr, R. E.....Minneapolis  
Farrish, R. C.....Sherburn  
Farrage, J. H.....Winnebago City  
Fawcett, C. E.....Stewartville  
Ferguson, J. B.....St. Paul  
Ferguson, J. C.....St. Paul  
Fields, Merton.....Northfield  
Fisher, G.....Minneapolis  
Fischer, H. P.....Shakopee  
Fischer, O. F.....Houston  
Fischer, P. M.....Shakopee  
Fisher, L. F.....Thief River Falls  
Fitzgerald, E. T.....Morris  
Fjeldstad, G. Alford.....Minneapolis  
Fleischhauer, D. S.....Wabasha  
Flemming, A. S.....Minneapolis  
Flinn, T. E.....Redwood Falls  
Flemming, James.....Cloquet  
Finn, B. P.....Redwood Falls  
Fogarty, Chas. W.....St. Paul  
Folken, F. G.....Albert Lea  
Flom, A. O.....Chisago City  
Flower, W. Z.....Minneapolis  
Forbes, R. S.....Duluth  
Forest, C. G.....Clearbrook  
Foster, Brainbridge.....Spring Valley  
Freeman, C. D.....St. Paul  
Franchere, F. W.....Lake Crystal  
Franzen, H. G.....Minneapolis  
Freeborn, J. A.....Fergus Falls  
Freed, O. J. R.....Cokato  
Freeman, Geo. H.....Willmar  
Freeman, J. P.....Glenville  
Freeman, W. L.....Foley  
Frehlig, E. O'B.....Stillwater  
French, H. S.....Grove City  
Friesleben, Wm.....Sauk Rapids  
Fritsch, F. P.....Gibson  
Froelich, H. W.....Thief River Falls  
Frost, E. H.....Willmar  
Frost, Harry T.....Crookston  
Fulton, J. F.....St. Paul  
Furber, W. W.....Cottage Grove

Gaines, E. C.....Buffalo Lake  
Gamble, J. W.....Rochester  
Gardner, Edwin L.....Minneapolis  
Gates, J. A.....Kenyon  
Gauger, E. C.....St. Paul  
Gauthier, W.....Virginia  
Geer, Everett K.....St. Paul  
Geissenger, John D.....St. Paul  
Giessler, Paul W.....Minneapolis  
Geist, Emil S.....Minneapolis  
Geist, George A.....St. Paul  
Gelz, J. J.....Richmond  
Gendron, J. F.....Grand Rapids  
Germo, Chas.....Balaton  
Ghent, C. Harry.....St. Paul  
Ghent, M. M.....St. Paul  
Ghostley, Mary C.....International Falls  
Gibbon, L. L.....Lowry  
Giffin, H. Z.....Rochester  
Gilbert, Geo. C.....Hill City  
Gilbert, John.....Carlton  
Gillfillan, J. S.....St. Paul  
Gillespie, N. H.....Duluth

Gillette, A. J.....St. Paul  
Gilkinson, A. J.....Osakis  
Gilmore, R.....Bemidji  
Ginsberg, Wm.....St. Paul  
Giroux, A. A.....Duluth  
Glyer, R. T.....Brooten  
Goehrs, H. W.....St. Cloud  
Goekerman, W. H.....Rochester  
Goldberg, M. L.....Jasper  
Goltz, E. V.....St. Paul  
Golden, C. M.....Tyler  
Goodman, C. F.....Virginia  
Gordon, Geo. J.....Minneapolis  
Gosslee, G. L.....Moorhead  
Gothan, C. L.....St. Paul  
Graham, C.....Rochester  
Graham David.....Duluth  
Graham, Robert.....Duluth  
Graham, R. D.....Duluth  
Granger, C. T.....Rochester  
Granger, S. Booker.....Rochester  
Graun, F. A.....Duluth  
Graves, C.....Aitkin  
Gratzek, Thos.....St. Paul  
Gray, C. E.....Rush City  
Gray, F. D.....Marshall  
Greeley, L. Q.....Duluth  
Green, E. K.....Minneapolis  
Greene, Charles L.....St. Paul  
Griffen, P. J.....Fertile  
Grimmes, H. B.....Madella  
Grise, W. B.....Austin  
Groebner, Otto A.....St. Paul  
Ground, H. T.....Virginia  
Gruenhagen, Arnold P.....St. Paul  
Guilford, H. M.....Minneapolis  
Gulde, W. C.....Minneapolis  
Gulifox, A.....Albert Lea  
Gumper, J. B.....Becker  
Gunderson, Harley J.....Minneapolis  
Gunderson, R. M.....Lake Park  
Gunz, A. N.....Center City  
Guyer, L. G.....Waseca

Haberman, E.....Osakis  
Haessley, S. E.....Faribault  
Haganan, Geo. K.....St. Paul  
Hagen, G. L.....Minneapolis  
Hagen, H. O.....New Richland  
Hagen, O. E.....Butterfield  
Hagen, O. J.....Moorhead  
Haggard, G. D.....Minneapolis  
Haight, G. G.....Audubon  
Haines, J. H.....Stillwater  
Hall, A. R.....St. Paul  
Hall, E. L.....Tracy  
Hall, J. M.....Minneapolis  
Hall, P. M.....State Sanitorium  
Hallberg, C. A.....Rochester  
Hallenebeck, D. F.....Rochester  
Hallowell, W. H.....Minneapolis  
Hamel, Arnold L.....Minneapolis  
Hamel, C. E.....Minneapolis  
Hamilton, A. S.....Minneapolis  
Hammes, E. M.....St. Paul  
Hammond, J. F.....St. Paul  
Hand, W. R.....Elbow Lake  
Haney, C. L.....Duluth  
Hanson, A. M.....Faribault  
Hanson, Erling.....Minneapolis  
Hanson, H. J.....New London  
Hanson, Olga S.....Minneapolis  
Hare, E. R.....Minneapolis  
Harriman, L.....Howard Lake  
Harrington, C. D.....Minneapolis  
Harrison, E. E.....West Concord  
Hart, A. B.....Owatonna  
Hart, M. J.....LeRoy  
Hartman, H. R.....Rochester  
Hartung, H. A.....Le Sueur  
Hartzell, Thos. B.....Minneapolis  
Haskell, A. D.....Alexandria  
Haskins, John L.....Morgan  
Hathaway, S. J.....St. Paul  
Hauge, M. M.....Clarkfield  
Haugen, G. T.....Fergus Falls  
Haugen, O. N.....Fergus Falls  
Havens, John G. W.....Austin  
Haverfield, Addie K.....Minneapolis  
Hawkins, E. P.....Montrose  
Hawkins, V. J.....St. Paul  
Hayes, J. M.....Rochester  
Hayes, M. F.....Nashwauk  
Haynes, B. H.....St. James  
Head, G. D.....Minneapolis  
Heagerty, W. B.....Mazeppa  
Healy, R. F.....Pierz  
Heath, A. C.....St. Paul  
Hedback, A. E.....Minneapolis



Hedblorn, C. A.....Rochester  
 Heim, Russell R.....Minneapolis  
 Hegge, C. A.....Austin  
 Hegge, O. H.....Austin  
 Heimark, J. H.....Moorhead  
 Heimark, O. E.....Duluth  
 Heise, W. F. C.....Winona  
 Helk, H. H.....Minneapolis  
 Helland, G. M.....Spring Grove  
 Helland, J. W.....Spring Grove  
 Hemstad, Warner.....St. Cloud  
 Henderson, A. G.....Kiester  
 Henderson, M. S.....Rochester  
 Hengstler, W. H.....St. Paul  
 Henney, Wm. H.....McIntosh  
 Hendrickson, J. F.....Minneapolis  
 Henriksen, H. G.....New Market  
 Henry, C. E.....Minneapolis  
 Hensel, C. N.....St. Paul  
 Henslin, A. E.....Le Roy  
 Herrick Stanley E.....Minneapolis  
 Herrmann, Edgar T.....St. Paul  
 Hertel, G. E.....Austin  
 Hesselgrave, S. S.....St. Paul  
 Hesselting, Verner T.....Taylors Falls  
 Heyerdale, O. C.....Rochester  
 Hiebert, J. P.....Minneapolis  
 Higgins, J. H.....Minneapolis  
 Hilger, A. W.....St. Paul  
 Hilger, D. D.....St. Paul  
 Hilger, J. M.....Iona  
 Hilger, L. A.....St. Paul  
 Hill, Eleanor J.....Minneapolis  
 Hill, R. J.....Minneapolis  
 Hirschboeck, F. J.....Duluth  
 Hirschfield, M. S.....Duluth  
 Hitchings, W. P.....Lakefield  
 Hobbs, C. A.....Minneapolis  
 Hoff, Alfred.....St. Paul  
 Hoff, Peder A.....St. Paul  
 Hoffman J.....Henning  
 Hoidale, A. D.....Tracy  
 Hoiland, A. S.....Minneapolis  
 Hoit, E. E.....Detroit  
 Holcomb, J. T.....St. Paul  
 Holcomb, O. W.....St. Paul  
 Holl, P. M.....Minneapolis  
 Holdridge, Geo. Foley.....Foley  
 Hollands, W. W.....Fisher  
 Holmberg, L. J.....Canby  
 Holmes, W. B.....Ada  
 Holst, C. F.....Little Falls  
 Holst, J. B.....Little Falls  
 Holte, H.....Crookston  
 Hodapp, R. J.....Madelia  
 Hodge, S. V.....Minneapolis  
 Hodgson, H. H.....Crookston  
 Holbrook, J. S.....Mankato  
 Holm, P. F.....Wells  
 Holman, C. J.....Mankato  
 Howde, Rolf.....Winthrop  
 Howard, S. E.....Rochester  
 Howard, W. S.....St. Paul  
 Howe, A. W.....Minneapolis  
 Hubert, R. L.....Los Angeles  
 Huenekens, E. J.....Minneapolis  
 Huffman, R. W.....Elgin  
 Hullsieck, H. E.....St. Paul  
 Humphrey, E. W.....Moorhead  
 Humphrey, W. R.....Stillwater  
 Hunt, H. E.....St. Paul  
 Hunt, F. N.....Fairmont  
 Hunt, R. C.....Fairmont  
 Hunt, V. C.....Rochester  
 Hunt, W. A.....Northfield  
 Hunte, A. F.....Truman  
 Hursh, M. M.....Grand Rapids  
 Huxley, F. R.....Faribault  
 Hvoslef, Jacob.....Minneapolis  
 Hynes, John E.....Minneapolis

Ide, A. W.....Brainerd  
 Iden, B. F.....Minneapolis  
 Ikeda, Kano.....Minneapolis  
 Irvine, H. G.....Minneapolis

Jacobs, A. C.....Elmore  
 Jacobs, John C.....Willmar  
 Jacquoat, G. L.....Ivanhoe  
 James, J. H.....Mankato  
 Jamieson, Earl.....Walnut Grove  
 Jarvis, Bruce W.....Minneapolis  
 Jellison, E. R.....New Auburn  
 Jenckes, H. D.....Pipestone  
 Jensen, M. J.....Minneapolis  
 Jensen, T. J.....Duluth  
 Jeslon, J. W.....St. Paul  
 Jensen, J. C.....Hendricks

Johnson, A. E.....Red Wing  
 Johnson, A. Elof.....Minneapolis  
 Johnson, Asa M.....St. Paul  
 Johnson, Carl E.....Minneapolis  
 Johnson, C. M.....Dawson  
 Johnson, E. W.....Bemidji  
 Johnson, Hartland C.....St. Paul  
 Johnson, H. M.....Dawson  
 Johnson, G. L.....Newfolden  
 Johnson, Hans.....Kirkhoven  
 Johnson, H. P.....Fairmont  
 Johnson, James A.....Minneapolis  
 Johnson, Julius.....Minneapolis  
 Johnson, Nimrod.....Minneapolis  
 Johnson, R. A.....Minneapolis  
 Johnson, T. H.....St. Paul  
 Josewich, Alexander.....Minneapolis  
 Jones, H. W.....Minneapolis  
 Jones, W. A.....Minneapolis  
 Jones, A. W.....Red Wing  
 Jones, E. M.....St. Paul  
 Joyce, S. T.....Rochester  
 Joyce, T. M.....Janesville  
 Judd, E. S.....Rochester  
 Judson, W. E.....Duluth  
 Just, A. A.....Crookston

Kabrick, O. A.....Odin  
 Kalinoff, D.....Stillwater  
 Kamp, B. A.....Albert Lea  
 Kanne, C. W.....Faribault  
 Kannary, E. L.....St. Paul  
 Karn, B. R.....Ortonville  
 Keeling, F. L.....Lakefield  
 Kelly, B. W.....Aitkin  
 Kelly, John V.....St. Paul  
 Kelly, Paul H.....St. Paul  
 Kelsey, C. G.....Hinckley  
 Kemp, A. F.....Mankato  
 Kennedy, C. C.....Minneapolis  
 Kennedy, Jane F.....Minneapolis  
 Kennedy, R. Ray.....Minneapolis  
 Kenyon, Paul.....Wadena  
 Keisling, I. H.....Nashwauck  
 Kern, M. J.....St. Cloud  
 Kesting, Herman.....St. Paul  
 Keyes, C. R.....Duluth  
 Keyes, E. D.....Winona  
 Kibbe, O. A.....Canton  
 Kierland, P. E.....Harmony  
 Kilbourne, A. F.....Rochester  
 Kilbridge, J. S.....Canby  
 Kimball, H. H.....Minneapolis  
 King, E. A.....Minneapolis  
 King, Walter E.....St. Paul  
 King, C. P.....Rochester  
 King, W. S.....Eveleth  
 Kirk, G. P.....East Grand Forks  
 Kirms, Geo. W.....Minneapolis  
 Kirsch, R. L.....Crookston  
 Kirtrud, G.....St. Paul  
 Kistler, C. M.....Minneapolis  
 Kittelson, John A.....St. Paul  
 Kittelson, T. V.....Fergus Falls  
 Kjelland, J. S.....Crookston  
 Klein, Harry.....Duluth  
 Klein, H. N.....St. Paul  
 Knauff, M. K.....St. Paul  
 Knickerbocker, F. H.....Staples  
 Knight, H. L.....Minneapolis  
 Knight, Ray Roberts.....Minneapolis  
 Knudtson, H. M.....Pipestone  
 Koch, John Charles.....Minneapolis  
 Kohler, F. G.....Hector  
 Kohler, G. A.....Minneapolis  
 Koller, Herman M.....Minneapolis  
 Koller, L. R.....Minneapolis  
 Kolset, Carl D.....Benson  
 Kraft, Peter.....Duluth  
 Kramer, G. B.....St. Paul  
 Kran, N. D.....Coleraine  
 Kreimer, Walter J.....Minneapolis  
 Kuhlman, Aug.....Melrose  
 Laird, A. T.....Nopeming  
 Lajoie, John M.....Minneapolis  
 Lande, W. B.....St. Paul  
 Kuth, J. R.....Duluth

Lane, Laura A.....Faribault  
 Laney, R. L.....Deer River  
 Langenderfer, F. V.....St. Paul  
 Lannin, J. C.....Mabel  
 La Pierre, C. A.....Minneapolis  
 Larsen, C. L.....St. Paul  
 Larson, O. O.....Detroit  
 Laurent, A. A.....Minneapolis  
 La Vake, R. T.....Minneapolis  
 Law, A. A.....Minneapolis  
 Leach, W. D.....Calaway

Leahy, Bartholomew.....St. Paul  
 Leavenworth, Richard O.....St. Paul  
 Leavitt, H. H.....Minneapolis  
 Leck, Clifford C.....Austin  
 Le Clerc, J. E.....Le Sueur  
 Lebowsky, Joseph A.....Minneapolis  
 Lee, W. A.....Fergus Falls  
 Lee, Walter N.....Madison  
 Lee, W. P.....Northfield  
 Leibold, H. H.....Parkers Prairie  
 Leicht, O.....Winona  
 Leichtenstein, H.....Winona  
 Leigh, H. J.....Lakefield  
 Leitch, Archibald.....St. Paul  
 Leland, John T.....Herman  
 Leland, M. N.....Minneapolis  
 Lemon, W. S.....Rochester  
 Lenont, C. B.....Virginia  
 Lepak, F. J.....Duluth  
 Lepak, John A.....St. Paul  
 Lerche, William.....St. Paul  
 Lester, C. A.....Winona  
 Leuty, Amos.....Morris  
 Lewis, A. J.....Henning  
 Lewis, C. B.....St. Cloud  
 Lewis, Chas. T.....Austin  
 Lewis, E. J.....Sauk Center  
 Lewis, J. B.....South St. Paul  
 Lewis, J. D.....Minneapolis  
 Lewis, W. W.....St. Paul  
 Lexa, F. J.....Lonsdale  
 C. Louis Lick.....St. Paul  
 Lillie, H. T.....Rochester  
 Lillie, W. T.....Rochester  
 Lima, Ludwig.....Montevideo  
 Lind, C. J.....Minneapolis  
 Linde, Herman.....Cyrus  
 Lindsay, W. V.....Winona  
 Lindgren, E. T.....Duluth  
 Linneman, N. L.....Duluth  
 Linner, H. P.....Minneapolis  
 Linstrom, Jarl.....Minneapolis  
 Linton, W. B.....Rochester  
 Litchfield, John T.....Minneapolis  
 Little, W. J.....St. Paul  
 Litzenberg, J. C.....Minneapolis  
 Lloyd, H. J.....Mankato  
 Logan, A. H.....Rochester  
 Logan, F. W.....Blue Earth  
 Logefell, Rudolph C.....Minneapolis  
 Lokken, O. E.....Crookston  
 Lommen, A. P.....Lanesboro  
 Lommen, P. A.....Austin  
 Loomis, E. M.....Minneapolis  
 Lowe, L. M.....Glyndon  
 Lowe, Thos.....Pipestone  
 Love, Fred A.....Carlos  
 Love, Geo. A.....Preston  
 Ludloff, A. G.....Mankato  
 Luedtke, G. H.....Fairmont  
 Lufkin, H. M.....St. Paul  
 Lum, C. E.....Duluth  
 Lundgren, A. C.....Minneapolis  
 Lynam, Frank.....Duluth  
 Lynch, J. L.....Winona  
 Lynch, M. J.....Minneapolis  
 Lyng, John.....Minneapolis  
 Lynn, J. F.....Waseca  
 Lyon, H. R.....Rochester  
 Lyon, J. D.....Minneapolis  
 Lysne, Henry.....Minneapolis

MacDonald, D. A.....Minneapolis  
 MacLaren, Archibald.....St. Paul  
 McCann, D. F.....Bemidji  
 McCarthy, W. J.....Madelia  
 McCarthy, W. R.....St. Paul  
 McClanahan, J. H.....White Bear  
 McClanahan, T. S.....White Bear  
 McCloud, C. N.....St. Paul  
 McComb, C. F.....Duluth  
 McCormick, Thos. F.....St. Paul  
 McCrea, James.....Fulda  
 McCuen, J. A.....Duluth  
 McDaniel, Orianna.....Minneapolis  
 McDavitt, Thos.....St. Paul  
 McDermott, T. E.....Minneapolis  
 McDonald, A. L.....Duluth  
 McDonald, H. N.....Minneapolis  
 McDonald, Irving C.....Minneapolis  
 McDougald, D. W.....Le Sueur  
 McDowell, J. P.....St. Cloud  
 McEachran, A.....Minneapolis  
 McGehre, E. C.....Hibbing  
 McGiffer, E. N.....Duluth  
 McGroarty, J. J.....Easton  
 McGuigan, H. P.....Red Wing  
 McHugh, Roderick F.....Aitkin

McIntire, H. M. .... Waseca  
 McIntyre, Geo. .... Minneapolis  
 McIntyre, John A. .... Round Lake  
 McKeon, Owen. .... St. Paul  
 McKenna, J. C. .... Austin  
 McKibben, N. E. .... St. Cloud  
 McKeown, E. G. .... Pipestone  
 McKinney, F. S. .... Minneapolis  
 McLaren, Jennette M. .... St. Paul  
 McLaughlin, E. M. .... Winona  
 McLaughlin, Jos. A. .... Minneapolis  
 McNevin, C. F. .... St. Paul  
 McPheeters, H. O. .... Minneapolis  
 Macnie, J. S. .... Minneapolis  
 Maercklein, I. R. .... Renville  
 Maetz, W. F. .... New Prague  
 Magie, H. W. .... Duluth  
 Magnusson, Herman V. .... Bell, Calif.  
 Maloney, T. J. .... St. Paul  
 Mann, A. T. .... Minneapolis  
 Manson, F. M. .... Worthington  
 Marclay, W. J. .... Minneapolis  
 Marcum, E. H. .... Bemidji  
 Mariette, Ernest. .... Hopkins  
 Mark, Arthur E. .... St. Paul  
 Mark, D. B. .... Minneapolis  
 Martineau, J. L. .... St. Paul  
 Masson, J. C. .... Rochester  
 Martin, Edw. T. .... Marble  
 Martin, T. R. .... Duluth  
 Mastin, E. V. .... Rochester  
 Matthews, Justus. .... Minneapolis  
 Mattick, Walter. .... Wauwatosa, Wis.  
 Maurer, E. L. .... Brownton  
 May, C. C. .... Adrian  
 May, C. E. .... Minneapolis  
 Mayo, C. H. .... Rochester  
 Mayo, W. J. .... Rochester  
 Mayland, M. L. .... Faribault  
 Mead, Marion. .... Minneapolis  
 Meckstroth, C. W. .... Brandon  
 Mee, P. H. .... Osseo  
 Meierding, Wm. A. .... Springfield  
 Mellicke, W. W. .... Nicollet  
 Meland, O. N. .... Warren  
 Melby, Benedict. .... Blooming Prairie  
 Melby, O. F. .... Thief River Falls  
 Melzer, R. G. .... Lyle  
 Merkert, G. L. .... Minneapolis  
 Merrill, J. E. .... Amboy  
 Merriman, L. L. .... Duluth  
 Merritt, G. F. .... St. Peter  
 Metcalf, F. W. .... Fulda  
 Metcalf, James N. .... Monticello  
 Mesker, G. H. .... Olivia  
 Meyer, E. L. .... Minneapolis  
 Meyerding, E. A. .... St. Paul  
 Meyerding, H. W. .... Rochester  
 Michael, J. C. .... Minneapolis  
 Mieghe, J. W. .... Ulen  
 Milan, M. Geo. .... Thief River Falls  
 Miller, H. A. .... Waseca  
 Miller, V. I. .... Mankato  
 Miller, W. A. .... New York Mills  
 Millsbaugh, J. G. .... Little Falls  
 Mingo, F. E. .... Hugo  
 Mitchell, Fredk. .... St. Paul  
 Mitchell, R. S. .... Grand Meadow  
 Moffatt, A. G. .... Howard Lake  
 Mogilner, S. N. .... St. Paul  
 Moir, Wm. W. .... Minneapolis  
 Molander, H. A. .... St. Paul  
 Molony, G. R. .... Belle Plaine  
 Molzahn, Herman E. .... St. Paul  
 Monahan, J. A. .... Minneapolis  
 Monahan, R. H. .... Minneapolis  
 Moore, A. B. .... Rochester  
 Moore, W. J. .... Adams  
 Moorhead, M. B. .... Minneapolis  
 More, C. W. .... Eveleth  
 Morehouse, G. G. .... Owatonna  
 Moren, E. .... Minneapolis  
 Mork, B. O. .... Worthington  
 Morrell, W. N. .... Verndale  
 Morley, G. A. .... Crookston  
 Morris, E. H. .... Austin  
 Morris, R. E. .... Minneapolis  
 Morrison, A. W. .... Minneapolis  
 Morrissey, F. B. .... St. Paul  
 Morse, John. .... Minneapolis  
 Morse, M. P. .... LeRoy  
 Morse, W. E. H. .... Morristown  
 Morsman, L. W. .... Hibbing  
 Morss, C. R. .... Coleraine  
 Mortenson, N. G. .... St. Paul  
 Moynihan, A. F. .... Sauk Center  
 Moynihan, T. J. .... St. Paul  
 Muehligh, G. F. .... Rochester

Mulder, John L. .... Chaska  
 Murdock, H. G. .... Taylors Falls  
 Murphy, E. F. .... St. Paul  
 Murphy, T. J. .... Minneapolis  
 Murray, D. J. .... Duluth  
 Murray, W. R. .... Minneapolis  
 Mussey, R. D. .... Rochester  
 Myers, Thos. .... St. Paul

Naegeli, Frank. .... Fergus Falls  
 Nannestad, J. R. .... Albert Lea  
 Nass, H. A. .... Mabel  
 Nauth, W. W. .... Winona  
 Nelson, C. P. .... Minneapolis  
 Nelson, H. E. .... Crookston  
 Nelson, H. S. .... Minneapolis  
 Nelson, M. S. .... Spring Grove  
 Nelson, N. A. .... Dawson  
 Nelson, O. C. .... Rochester  
 Neuman, C. A. .... Lewiston  
 Neuman, W. A. .... Lewiston  
 New, S. B. .... Rochester  
 Newman, G. A. .... Stillwater  
 Newhart, Horace. .... Minneapolis  
 Neher, F. H. .... St. Paul  
 Nelson, L. A. .... St. Paul  
 Nicholson, J. .... Brainerd  
 Nicholson, M. A. .... Duluth  
 Nippert, H. T. .... St. Paul  
 Nipper, L. A. .... Minneapolis  
 Nixon, Chas. C. .... Minneapolis  
 Nissen, Henrik. .... Minneapolis  
 Nordin, C. G. .... Brainerd  
 Nordin, G. T. .... Minneapolis  
 Nordland, Martin. .... Minneapolis  
 Norman, J. E. .... Crookston  
 Norris, Edgar H. .... St. Paul  
 Noth, H. W. .... Minneapolis  
 Nye, Katherine A. .... St. Paul  
 Novak, E. E. .... New Prague

O'Brien, H. J. .... St. Paul  
 O'Connor, Dr. .... Eden Valley  
 O'Donnell, D. M. .... Ortonville  
 O'Donnell, J. E. .... Minneapolis  
 O'Hara, J. J. .... Janesville  
 O'Leary, P. A. .... Rochester  
 O'Neil, J. W. .... Nashauk  
 Oberg, C. M. .... Minneapolis  
 Oerting, Harry. .... St. Paul  
 Ogden, B. H. .... St. Paul  
 Ohage, Justus, Jr. .... St. Paul  
 Oliver, C. I. .... Graceville  
 Olson, Chas. A. .... St. Paul  
 Olson, F. A. .... Minneapolis  
 Olson, G. M. .... Minneapolis  
 Olson, Olaf A. .... Minneapolis  
 Olson, O. H. .... Erskine  
 Olson, R. G. .... Minneapolis  
 Olson, W. P. .... Gaylord  
 Onsgard, C. K. .... Halstad  
 Onsgard, L. K. .... Houston  
 Opheim, O. V. .... Starbuck  
 Oppegard, M. O. .... Crookston  
 Oredson, O. A. .... Duluth  
 Orton, H. N. .... Minneapolis  
 Osborn, Lida. .... Mankato  
 Ostergren, E. W. .... St. Paul  
 Otto, H. C. .... Frazer  
 Overend, K. S. .... Hallock  
 Owre, Oscar. .... Minneapolis

Pake, S. G. .... Duluth  
 Palm, W. G. .... Climax  
 Palmer, W. L. .... Albert Lea  
 Paradine, J. .... Duluth  
 Parl, L. T. .... Duluth  
 Parker, O. W. .... Ely  
 Parson, G. E. .... Elk River  
 Parker, E. H. .... Minneapolis  
 Parks, A. H. .... Minneapolis  
 Parrot, B. W. .... Long Prairie  
 Passer, A. A. .... Olivia  
 Patterson, C. H. .... Barnesville  
 Patterson, W. E. .... Westbrook  
 Patterson, W. L. .... Fergus Falls  
 Paulson, A. J. .... Thief River Falls  
 Paulsen, E. L. .... Minneapolis  
 Paulson, T. S. .... Fergus Falls  
 Payette, C. H. .... Duluth  
 Pearson, F. R. .... St. Paul  
 Pederson, R. M. .... Minneapolis  
 Pelant, F. J. .... New Ulm  
 Pemberton, J. de J. .... Rochester  
 Pengelly, E. J. .... Iron-ton  
 Penhall, F. W. .... Morton  
 Pennie, D. F. .... Duluth  
 Peppard, T. A. .... Minneapolis  
 Perkins, J. .... Sanborn

Perry, C. G. .... St. Paul  
 Perry, Ralph St. John. .... Minneapolis  
 Persons, C. E. .... Marshall  
 Peterson, Alfred. .... Dassel  
 Peterson, Christian. .... Owatonna  
 Peterson, H. E. .... Granite Falls  
 Peterson, O. H. .... Minneapolis  
 Peterson, Thorvald. .... Minneapolis  
 Peterson, R. A. .... Vesta  
 Peterson, V. N. .... St. Paul  
 Pettit, C. W. .... Minneapolis  
 Phelps, Kenneth. .... Minneapolis  
 Phelps, R. M. .... St. Peter  
 Phillips, A. E. .... Delano  
 Phillips, J. G. .... Northfield  
 Phlinger, L. B. .... Rochester  
 Phnstad, J. .... McIntosh  
 Pierce, Chas. H. .... Wadena  
 Pierson, Homer F. .... Austin  
 Pilon, P. C. .... Paynesville  
 Pine, Auten, A. .... St. Paul  
 Pinea, W. B. .... Minneapolis  
 Piper, M. C. .... Rochester  
 Piper, Wm. A. .... Mountain Lake  
 Platt, J. J. .... St. Paul  
 Plondke, F. J. .... St. Paul  
 Plonski, C. J. .... Faribault  
 Plummer, H. S. .... Rochester  
 Plummer, W. A. .... Rochester  
 Poehler, F. T. .... Minneapolis  
 Poirier, J. A. .... Forest Lake  
 Polock, L. W. .... Rochester  
 Pool, Daniel. .... St. Paul  
 Poppe, Fred H. .... Minneapolis  
 Power, J. E. .... Duluth  
 Powers, F. W. .... Barrett  
 Prangen, A. D. .... Rochester  
 Pratt, C. C. .... Mankato  
 Pratt, Fred J. .... Minneapolis  
 Pratt, J. A. .... Minneapolis  
 Prichard, D. B. .... Winona  
 Priens, I. A. .... Minneapolis  
 Prim, J. A. .... Minneapolis  
 Puffer, F. L. .... Bird Island  
 Putney, G. E. .... Paynesville

Quackenbush, W. K. .... Battle Lake  
 Quinby, Thos. F. .... Minneapolis  
 Quinn, Jas. A. .... St. Paul  
 Quist, H. W. .... Minneapolis

Radabaugh, R. C. .... Hastings  
 Rahala, John. .... Virginia  
 Rains, J. M. .... Willmar  
 Ralfer, Franklin W. S. .... Cloquet  
 Ramsey, W. R. .... St. Paul  
 Randall, A. M. .... Ashby  
 Randall, B. M. .... Graceville  
 Rankin, A. A. .... Zumbro Falls  
 Ranson, M. L. .... Hancock  
 Ratcliffe, J. J. .... Aitkin  
 Rathbun, A. M. .... Rice  
 Rathbun, C. A. .... Sauk Rapids  
 Ravu, B. .... Windom  
 Reberman, E. C. .... Austin  
 Rees, S. P. .... Minneapolis  
 Reeve, E. T. .... Elbow Lake  
 Reimer, S. W. .... Breckenridge  
 Reimstead, C. S. .... Brainerd  
 Replogle, W. H. .... Wabasha  
 Reynolds, Hugh. .... Hibbing  
 Reynolds, J. S. .... Minneapolis  
 Rheim, J. E. .... Mora  
 Rhines, D. C. .... Caledonia  
 Rice, G. D. .... St. Cloud  
 Richards, E. T. F. .... St. Paul  
 Richardson, W. E. .... Pipestone  
 Richardson, W. J. .... Fairmont  
 Richmond, Chas. D. .... Jeffer  
 Ridgway, A. M. .... Annandale  
 Ridgeway, Alexander. .... Belgrad  
 Riggs, C. E. .... St. Paul  
 Rishmiller, J. H. .... Minneapolis  
 Ritchie, H. P. .... St. Paul  
 Roan, Carl M. .... Minneapolis  
 Robbins, C. P. .... Winona  
 Roberts, L. M. .... Little Falls  
 Robert, Thos. S. .... Minneapolis  
 Roberts, W. B. .... Minneapolis  
 Robertson, A. W. .... Litchfield  
 Robertson, H. E. .... Minneapolis  
 Robertson, J. B. .... Cottonwood  
 Robertson, W. P. .... Litchfield  
 Robilliard, C. M. .... Faribault  
 Robilliard, W. H. .... Faribault  
 Robinson, J. M. .... Duluth  
 Robitshek, E. C. .... Minneapolis  
 Rochford, W. E. .... Minneapolis  
 Rodda, F. C. .... Minneapolis



Rodgers, C. L. .... Minneapolis  
 Rogers, John T. .... St. Paul  
 Roholt, C. L. .... South Haven  
 Rollins, F. H. .... St. Charles  
 Rood, D. C. .... Hibbing  
 Roodquist, C. S. .... Hibbing  
 Roodman, I. M. .... Ponsford  
 Rose, J. T. .... Lakefield  
 Rosen, S. .... Minneapolis  
 Rosenberg, B. P. .... Winona  
 Roselow, E. C. .... Rochester  
 Rosseau, Victor. .... Maple Lake  
 Rothenberg, J. C. .... Springfield  
 Rothrock, J. L. .... St. Paul  
 Rothschild, H. J. .... St. Paul  
 Rowe, O. W. .... Duluth  
 Rowe, W. H. .... St. James  
 Roy, Philemon. .... St. Paul  
 Roy, J. A. .... Stephen  
 Rumph, W. H. .... Faribault  
 Russel, H. R. .... Stewartville  
 Rutherford, W. C. .... St. Paul  
 Rutledge, L. H. .... Detroit  
 Ryan, John J. .... St. Paul  
 Rystad, O. H. .... Crookston

St. Clair, G. G. .... Duluth  
 Saam, J. G. .... Eveleth  
 Sanderson, E. T. .... Minnetota  
 Sanford, A. H. .... Rochester  
 Sargeant, H. L. .... Dalton  
 Satersmoen, Theo. .... Pelican Rapids  
 Sather, E. R. .... Spring Valley  
 Sawyer, P. .... Goodhue  
 Savage, F. J. .... St. Paul  
 Schaaf, F. H. K. .... Minneapolis  
 Schaffer, S. .... Winona  
 Schatz, F. J. .... Rosemount  
 Schefcik, J. T. .... Minneapolis  
 Schere, C. A. .... Duluth  
 Schlesselman, J. T. .... Mankato  
 Schneider, J. P. .... Minneapolis  
 Schoch, R. B. .... St. Paul  
 Schons, E. .... St. Paul  
 Schmitt, A. F. .... Mankato  
 Schmidt, G. .... Lake City  
 Schmidt, P. A. .... Good Thunder  
 Schneider, H. A. .... Jordan  
 Schoid, J. L. .... New Ulm  
 Schroeder, C. H. .... Duluth  
 Schuldt, F. C. .... St. Paul  
 Schultz, Fred W. .... Minneapolis  
 Schultz, J. A. .... Albert Lea  
 Schulze, Albert G. .... St. Paul  
 Schwartz, A. H. .... Duluth  
 Schwyzer, Arnold. .... St. Paul  
 Schwyzer, G. .... Minneapolis  
 Scofield, C. L. .... Benson  
 Scott, T. W. .... St. Charles  
 Seashore, D. E. .... Duluth  
 Seashore, Gilbert. .... Minneapolis  
 Sedgwick, J. P. .... Minneapolis  
 Seham, Max. .... Minneapolis  
 Selle, Fred. .... Winthrop  
 Senkler, G. E. .... St. Paul  
 Senn, E. W. .... Owatonna  
 Serkland, J. C. .... Rothsay  
 Sessions, John. .... Minneapolis  
 Shapere, A. D. .... St. Paul  
 Shaleen, A. W. .... Hallock  
 Shannon, Ray. .... St. Paul  
 Shapiro, E. Z. .... Duluth  
 Shaw, A. W. .... Buhl  
 Shedlov, A. .... Gully  
 Sheldon, W. S. .... Rochester  
 Shelland, J. T. .... Ada  
 Shellman, John L. .... St. Paul  
 Shelver, H. J. .... Ortonville  
 Sheppard, Fred. .... Hutchinson  
 Sheppard, P. E. .... Hutchinson  
 Sherman, C. L. .... Luverne  
 Sherwood, G. E. .... Kimball  
 Sherping, O. Th. .... Fergus Falls  
 Shimonek, Anton. .... St. Paul  
 Shottler, G. J. .... Dexter  
 Shrader, E. E. .... Watertown  
 Shroder, J. S. .... Springfield  
 Shulean, Nellie S. .... Cambridge  
 Simison, C. W. .... Hawley  
 Simon, B. F. .... St. Paul  
 Simon, Geo. H. .... St. Paul  
 Simons, Jalmar. .... Minneapolis  
 Simpson, E. D. .... Minneapolis  
 Simpson, J. D. .... Minneapolis  
 Sistrunk, W. E. .... Rochester  
 Sivertson, Ivar. .... Minneapolis  
 Skinner, H. O. .... St. Paul  
 Slater, S. A. .... Worthington

Slocumb, J. A. .... Plainview  
 Slocumb, Maude S. .... Minneapolis  
 Slyfield, F. F. .... Duluth  
 Smallwood, J. T. .... Worthington  
 Smersh, F. M. .... Owatonna  
 Smersh, J. F. .... Owatonna  
 Smith, Arthur. .... Minneapolis  
 Smith, C. M. .... Coleraine  
 Smith, I. D. .... Kasson  
 Smith, F. L. .... Rochester  
 Smith, Homer R. .... Minneapolis  
 Smith, Norman M. .... Minneapolis  
 Smith, P. A. .... Faribault  
 Smith, S. G. .... Montevideo  
 Smitty, M. W. .... Red Wing  
 Snell, Albert N. .... Mankato  
 Sneve, Haldor. .... St. Paul  
 Soderlind, A. .... Minneapolis  
 Sohlerberg, Olof. .... St. Paul  
 Sogge, L. .... Windom  
 Souba, Fred J. .... Minneapolis  
 Spicer, F. W. .... Duluth  
 Spratt, C. N. .... Minneapolis  
 Spurbeck, R. I. .... Cloquet  
 Stacey, L. J. .... Rochester  
 Staley, J. C. .... St. Paul  
 Stanley, C. R. .... Worthington  
 Staples, H. L. .... Minneapolis  
 Steen, A. H. .... Cottage Grove  
 Steiner, I. W. .... Winona  
 Stemsrud, A. A. .... Dawson  
 Sterner, E. G. .... St. Paul  
 Sterner, O. W. .... St. Paul  
 Stevens, F. A. .... Lake Elmo  
 Steven, Leo. .... Byron  
 Stevenson, R. G. .... Albert Lea  
 Stewart, A. B. .... Owatonna  
 Stewart, R. I. .... Wendell  
 Stierle, Adolph Jr. .... St. Paul  
 Stinnette, S. E. .... St. Paul  
 Stokes, J. H. .... Rochester  
 Stolpestad, H. L. .... St. Paul  
 Stomel, Joseph. .... Minneapolis  
 Stowe, A. J. .... Rush City  
 Strathern, F. P. .... St. Peter  
 Strathern, M. L. .... Gilbert  
 Strauchauer, A. C. .... Minneapolis  
 Stricklet, A. F. .... Sleepy Eye  
 Strickler, May. .... Sleepy Eye  
 Stroble, W. G. .... Welcome  
 Strout, E. S. .... Minneapolis  
 Stuart, A. B. .... Cloquet  
 Stuh, Henry C. .... Minneapolis  
 Stuh, J. W. .... Stillwater  
 Sukeforth, L. A. .... Duluth  
 Sutherland, H. N. .... Ely  
 Sutton, Chas. S. .... St. Cloud  
 Sutton, G. E. .... Rochester  
 Sutton, L. F. .... St. Paul  
 Sohmer, A. E. .... Mankato  
 Sturre, J. R. .... Watkins  
 Sundt, M. .... Minneapolis  
 Swanson, Edwin O. .... St. Paul  
 Swartwood, F. A. .... Waseca  
 Swedenberg, A. W. .... Thief River Falls  
 Sweeney, Arthur. .... St. Paul  
 Sweetman, R. H. .... Menahga  
 Sweetser, H. B. .... Minneapolis  
 Sweetser, Theodore. .... Minneapolis  
 Swentzer, S. E. .... Minneapolis  
 Swenson, Charles. .... Braham  
 Sybilrud, H. W. .... Bricelyn  
 Szlopka, T. J. .... Rochester

Taft, John O. .... Minneapolis  
 Taft, Walter L. .... Minneapolis  
 Tanner, A. C. .... Minneapolis  
 Taylor, A. C. .... Duluth  
 Taylor, C. W. .... Duluth  
 Taylor, H. L. .... St. Paul  
 Taylor, Wm. J. .... Pipestone  
 Teisberg, C. B. .... St. Paul  
 Tennyson, Theo. .... Minneapolis  
 Ten Broeck, Louis. .... Minneapolis  
 Thabes, J. A. .... Brainerd  
 Theissen, W. H. .... Faribault  
 Thimsen, N. C. .... Blooming Prairie  
 Thomas, Geo. E. .... Minneapolis  
 Thomas, Geo. H. .... Minneapolis  
 Thomas, Gilbert A. .... Minneapolis  
 Thompson, Albert. .... St. James  
 Thompson, H. H. .... Minneapolis  
 Thompson, V. C. .... Stillwater  
 Thordarson, Theo. .... Minnetota  
 Thorson, E. O. .... Luverne  
 Thoresen, Th. .... Buffalo  
 Thornby, H. J. .... Barnesville

Thyssel, F. A. .... Moorhead  
 Tibbetts, M. H. .... Duluth  
 Tiedeman, I. D. .... Heron Lake  
 Tierney, C. M. .... Granger  
 Tilderquist, D. L. .... Duluth  
 Tilton, A. J. .... Alden  
 Tingdale, A. C. .... Minneapolis  
 Tinker, C. W. .... Stewart  
 Tofte, Josephine. .... Pine City  
 Torkelson, P. T. .... Lyle  
 Towers, F. E. .... Minneapolis  
 Traeger, C. A. .... Faribault  
 Tunstead, Hugh. .... Minneapolis  
 Tuohy, E. L. .... Duluth  
 Turnbull, F. M. .... Duluth  
 Tweedt, G. .... Winona  
 Tyrrell, C. C. .... Minneapolis

Ulrich, Henry L. .... Minneapolis  
 Ulrich, Mabel S. .... Minneapolis  
 Undine, A. Clyde. .... Minneapolis  
 Urstad, O. H. .... Minneapolis  
 Utley, J. O. .... Minneapolis

Vadheim, A. L. .... Tyler  
 Valentine, W. H. .... Tracy  
 Van Deboget, Lewis. .... Minneapolis  
 Van Slyke, Chas. A. .... St. Paul  
 Van Valkenberg, B. A. .... Long Prairie  
 Vaughn, G. E. .... Winnebago City  
 Vercellini, C. E. .... Duluth  
 Vercellini, G. .... St. Paul  
 Verne, V. E. .... Moorhead  
 Vigen, J. G. .... Fergus Falls  
 Vinson, P. P. .... Rochester  
 Vollum, E. O. .... Albert Lea  
 Von Berg, J. P. .... Albert Lea  
 Von der Weyer, Wm. .... St. Paul  
 Voyer, Oswald. .... Minneapolis

Walker, A. E. .... Duluth  
 Ward, A. W. .... Minneapolis  
 Wald, R. H. .... South St. Paul  
 Waldron, Carl W. .... Minneapolis  
 Walker, C. C. .... Lamberton  
 Walker, G. H. .... Fairfax  
 Wallam, G. S. .... Warren  
 Wallinga, John A. .... St. Paul  
 Walker, Jas. D. .... Wilmont  
 Walters, Franklin R. .... Moose Lake  
 Wanous, E. Z. .... Minneapolis  
 Warham, T. T. .... Minneapolis  
 Warner, E. F. .... St. Paul  
 Warren, C. L. .... Le Roy  
 Warren, E. L. .... St. Paul  
 Warren, F. S. .... Faribault  
 Warren, J. W. .... Minneapolis  
 Warwick, Margaret. .... St. Paul  
 Watson, A. M. .... Royalton  
 Watson, F. G. .... Worthington  
 Watson, John D. .... Holdingford  
 Watson, N. M. .... Red Lake Falls  
 Watson, Talbert. .... Albany  
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 Webster, H. E. .... Duluth  
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 Weiser, F. R. .... Windom  
 Weiser, Geo. .... New Ulm  
 Weisman, S. A. .... Minneapolis  
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 Wells, H. J. .... Minneapolis  
 Wentworth, A. J. .... Mankato  
 Werner, N. L. .... Red Wing  
 Werner, O. S. .... Lindstrom  
 Westby, Nels. .... Madison  
 Weum, T. Wm. .... Minneapolis  
 Weston, C. G. .... Minneapolis  
 Wheeler, M. W. .... St. Paul  
 Whitacre, J. C. .... St. Paul  
 Whitcomb, Ed. H. .... St. Paul  
 White, J. B. .... Belle Plaine  
 White, J. S. .... St. Paul  
 White, Marx S. .... Minneapolis  
 Whiting, A. D. .... St. Cloud  
 Whitmore, F. W. .... St. Paul  
 Whitney, A. W. .... St. Paul  
 Wilcox, Ancha E. .... Minneapolis  
 Wilcox, F. L. .... Walker  
 Wilcox, M. Russell. .... Minneapolis  
 Wilder, R. M. .... Rochester  
 Wilkinson, Stella. .... Duluth  
 Will, W. W. .... Bertha  
 Willcut, Clarence. .... Minneapolis  
 Williams, A. E. .... Backus  
 Williams, A. L. .... Slayton  
 Williams, Clayton. .... St. Paul  
 Williams, Hugh O. .... Lake Crystal

Williams, John.....Lake Crystal  
Williams, R. J.....Pine River  
Williams, R. V.....Rushford  
Williams, Robert.....Minneapolis  
Willius, T. A.....Rochester  
Willson, Hugh S.....Minneapolis  
Wilson, C. E.....Blue Earth  
Wilson, Warren.....Northfield  
Wilson, L. B.....Rochester  
Wilson, W. F.....Lake City  
Wiltrout, I. Geo.....Oslo  
Winberg, O. K.....Lake Park  
Winnick, J. B.....St. Paul  
Wiseman, R. L.....Pine City  
Witham, C. A.....Minneapolis

Wittich, F. W.....Minneapolis  
Witherstone, W. H.....Rochester  
Wohrabe, A. A.....Minneapolis  
Wold, K. C.....St. Paul  
Wolner, Oscar H.....Gilbert  
Woltman, H. W.....Rochester  
Wood, Douglas F.....Minneapolis  
Wood, H. G.....St. Paul  
Woodard, F. R.....Minneapolis  
Woodruff, C. W.....Chatfield  
Woodworth, L. F.....Le Sueur Center  
Workman, H. M.....Tracy  
Workman, W. G.....Tracy  
Wray, W. E.....Campbell  
Wright, C. B.....Minneapolis

Wright, C. Darcy.....Minneapolis  
Wright, C. O.....Luverne  
Wright, Franklin R.....Minneapolis  
Wynne, H. M. N.....Minneapolis

Ylvisaker, L. S.....Minneapolis  
Yoerg, O. W.....Minneapolis  
Young, V. A.....Duluth

Zander, C. H.....St. Paul  
Zaworske, E. A.....Minneapolis  
Zeien, Thos.....North Branch  
Zimbeck, R. I.....Maynard  
Zimmerman, H. B.....St. Paul  
Ziskin, Thomas.....Minneapolis

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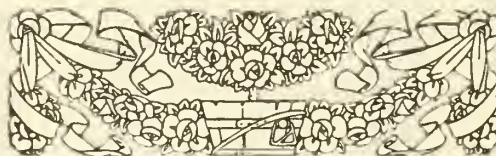
Berge, Hjalmar Melanchton.....U. of Minn., M. B. 1920.....Vancouver, B. C., c/o Gen. Hos.  
Bicek, Joseph Frederick.....U. of Minn., M. B. 1920.....St. Paul, Minn., c/o Miller Hos.  
Boman, Paul G.....U. of Minn., M. B. 1920.....Mpls. Minn., 329 Union St.  
Boynton, Ruth Evelyn.....U. of Minn., M. B. 1920.....Mpls. Minn., Univ. Hos.  
Boquist, Harold Samuel.....U. of Minn., M. B. 1920.....Mpls. Minn., 2210 Polk St.  
Brunkow, Clarence William.....U. of Minn., M. B. 1920.....Mpls. Minn., St. Mary's Hos.  
Churchill, Asa Glenn.....U. of Minn., M. B. 1920.....St. Paul, Minn., 681 Summit Ave.  
Critchfield, Ralph J.....U. of Minn., M. B. 1920.....Mpls. Minn., 1028 7th St.  
DeJong, Georgiana.....U. of Minn., M. B. 1920.....Faribault, Minn.  
Eppard, Raymond Martin.....U. of Minn., M. B. 1920.....Duluth, Minn.  
Flocken, Charles Frederick.....U. of Minn., M. B. 1920.....Mpls. Minn., 2624 Emerson Ave. S.  
Gearey, Verne Smith.....U. of Minn., M. B. 1920.....St. Paul, 1827 Laurel Ave.  
Gerber, Milo P.....U. of Minn., M. B. 1920.....Argyle, Minn.  
Gourdeau, Adolphe Edward.....U. of Minn., M. B. 1920.....Mpls. Minn., Univ. Hos.  
Herbolsheimer, Albert John.....U. of Minn., M. B. 1920.....Wadena, Minn.  
Hirshfield, Frank R.....U. of Minn., M. B. 1920.....Mpls. Minn., 1112 18th Ave.  
Kennedy, Roger Louis Joseph.....U. of Minn., M. B. 1920.....St. Paul, Minn., 321 Nelson Ave.  
Lee, John Leonard.....U. of Minn., M. B. 1920.....Elbow Lake, Minn.  
McCarty, James J.....Harvard, 1878.....Mpls. Minn., c/o Hotel Andrews  
Martin, Benjamin James.....U. of Minn., M. B. 1920.....St. Paul, Minn., c/o Miller Hos.  
Merkert, Chas. E.....U. of Minn., M. B. 1920.....Mpls. Minn., 2717 3rd Ave  
Nelson, Wilford Merriam.....Harvard, 1919.....Fergus Falls, Minn.  
Regnier, Edward Alexis.....U. of Minn., M. B. 1920.....Mpls. Minn., Univ. Hos.  
Rudie, Peter Severin.....U. of Minn., M. B. 1920.....Madelia, Minn.  
Simons, Bernard Henry.....U. of Minn., M. B. 1920.....Chaska, Minn.  
Vasenius, Frederick Walter.....Geo. Wash. U., 1909.....Chisholm, Minn.  
Warnock, Ralph Wallace.....U. of Minn., M. B. 1920.....Mpls. Minn., Gen. Hos.

### THROUGH RECIPROCITY

Basinger, Harvey Raymond.....Rush, M. D., 1916.....Spokane, Wash., 2211 W. Boone Ave  
Beery, Geno Ethel.....Hah. Chicago, 1920, M. D....Mpls. Minn., 2215 Western Ave.  
Brown, Lyle Leland.....U. of Ill., M. D. 1918.....Crookston, Minn.  
Devereaux, Thos. Jos.....Rush, M. D., 1915.....Mpls. Minn., 315 W 15th St.  
Fisher, Stephen.....Milwaukee, Med., 1903, M. D.....New Salem, N. D.  
Gaarde, Fred William.....Rush, 1912, M. D.....Rochester, Minn.  
Guedel, Arthur Ernest.....Indiana U., 1908, M. D.....Mpls. Minn., Athletic Club  
Perkins, James Robert.....Marquette, 1910, M. D.....Mpls. Minn., Radisson Hotel  
Stevens, Jos. Bonsall.....U. of Ill., M. D., 1920.....Luverne, Minn.

### NATIONAL BOARD CREDENTIALS

Brand, George Douglas.....Northwestern M. D., 1917....St. Paul, Minn., Lowry Bldg.  
White, Willard David.....Rush, M. D., 1919.....Mpls. Minn., 301 Phys. & Surg. Bldg.





# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### RECONSTRUCTIVE SURGERY\*

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*Chicago, Ill.*

The efforts of the government to reclaim disabled soldiers from the recent World War have made familiar such expressions as "physical reconstruction", "rehabilitation", "occupational therapy", "functional re-education", and similar terms. The work which these expressions represent will either go down in the medical history of the war as beautiful theories and dreams of a group of idealists, or will stand forth as one of the greatest by-products of the world's struggle. The permanency of these terms in the nomenclature of the medical profession depends upon the practical application of these methods to peace time practice.

It must be emphatically pointed out that while the author is dealing with this subject from the surgical standpoint, yet the rehabilitation of the handicapped due to chronic diseases—the heart cases, the tuberculous, the nervous and mental cases,—furnishes even a greater problem, which can be successfully solved by physical reconstructive methods.

Likewise it must be noted that prior to the war physical reconstruction of disabled employees had been successfully practiced in a number of our industrial concerns throughout the country, although this work was not so designated. In fact, industrial medicine as practiced in a few concerns has furnished the greatest example of the feasibility of this form of human conservation and human reclamation.

As a result of this medical work in industry, providing as it does for the prevention of disease or accidents among the workers, and for the

complete restoration of the unfortunate victims of either and, as a result of the efforts in the army for the physical reconstruction, functional training and proper replacement of the disabled soldiers in useful jobs,—I say, as a result of these two great experiences, a new viewpoint has permeated the profession. No longer can the physician be content with an immediate medical or surgical end-result; instead, his work will be judged more and more by the economic end-result. Has he used every means to secure the greatest possible functional restoration? Has he followed up his case after discharge from treatment, to ascertain whether the patient has returned to employment, and whether or not that employment is such as to cause a recurrence of the condition—especially exemplified in cardiac diseases? Has he imbued his patient with a desire again to become a useful citizen, or has he allowed him to become "hospitalized" or "parasitized"? The economic end-result involves an affirmative answer to all these questions. The busy physician alone cannot accomplish this result, but he can secure the cooperation of such agencies as will insure its accomplishment. In fact, this viewpoint of greater responsibility to the handicapped is causing a close alignment between the physicians, educators, employment managers and social agencies of the community.

#### DEFINITIONS

Physical Reconstruction comprehends continued and complete medical and surgical treatment until the maximum physical and mental restoration of the disabled individual has been secured. While applicable to every type of disease or injury, physical reconstruction is usually meant to refer to the restoration of the permanently handicapped. Maximum restoration does not mean that function is completely restored, but refers to the greatest possible recovery when the nature of the disability is considered.

Likewise, physical reconstruction includes the use of all adjuncts which will assist in securing

\*Read before the Southern Minnesota Medical Association meeting, Mankato, November, 1920.

this desired end. These adjuncts may be classified and defined as follows:

*Functional Re-education* consists of various methods to restore function in a disabled part, to train other members to new work, or to teach the amputation cases the use of artificial appliances.

*Occupational Therapy* is the use of some form of work which will bring into action certain muscles or disabled members of the body, in order to assist in their functional restoration, or which will keep the mind and body occupied during the long period of convalescence, thus preventing hospitalization and habits of idleness.

*Physiotherapy* includes the use of massage, hydro-, electro-, and mechanotherapy, muscle training exercises, gymnastics and calisthenics, for the purpose of restoring function or building up the general condition of the patient.

*Rehabilitation*, or the refitting of the disabled man to an independent economic position in society, consists of measures which are neither medical nor surgical, but which usually can be instituted during the course of the patient's medical treatment.

These measures include vocational training, or refitting the disabled for some specified work if his disability prevents the return to his former occupation, and the replacement of the handicapped at lucrative employment. Further medical and economic supervision is necessary to see that his rehabilitation is completed.

*Convalescent Centers* are places removed from the hospital and from the influence of the acutely sick, where patients no longer needing routine hospital care may be received after discharge, to convalesce under environment tending to hasten their restoration. In such a center, occupational therapy, physiotherapy and functional training are the chief methods of treatment.

*Social Services*: This is one of the most important adjuncts in the whole scheme of rehabilitating the permanently disabled. Its purpose is to combine with the curative work of the hospital a well organized human interest in the social and economic conditions of each patient in the wards. Such a department becomes the go-between twist the doctor and the hospital, and those social agencies which can assist in securing proper convalescent environment, reeducation

when necessary, and the proper placement of discharged patients.

Reconstructive surgery, therefore, deals with the individual who through disease or injury, is threatened with, or has already become, the victim of permanent disability. In the first instance, by reconstructive methods, the handicap may be prevented or greatly reduced; in the second instance, either surgery or some of the adjuncts above defined may be utilized to obtain greater functional restoration. In both cases it implies the use of all methods to rehabilitate the patient to a state of social independence.

Reconstructive surgery is not limited to any one specialty, but can be applied to the general surgical field. For example, the eye surgeon will often have recourse to its methods to re-educate his blind patients, to train them to walk alone, and place them in employment. I have used it and seen it used in cases of facial paralysis following operations on the head. Plastic surgery about the face and other parts of the body furnishes an excellent example. In empyema it has a useful field, and I take advantage of occupational therapy and physiotherapy, especially bodily exercises, in almost all my laparotomy cases. It is my chief aid in all cases of traumatic neuroses. Its greatest field undoubtedly lies in bone and joint surgery, amputations, tendon and nerve surgery, many cases seen in industrial surgery, and in the usual orthopedic cases.

I recently attended the Central Orthopedic Association's annual convention in Chicago and Milwaukee, and was impressed with the extension of this specialty into the field of general surgery, chiefly due to the orthopedist's conception of the functional restoration of the disabled. While club feet, the deformities of poliomyelitis, Potts' disease, and tuberculosis of joints and bones were the usual clinical cases shown, yet many cases of deformities and disabilities following injuries were demonstrated. These included fractures, recent and ununited, osteomyelitis, nerve and tendon suturing, amputation cases, empyema with necrosis of the ribs, bone cysts, including bone cysts of the maxilla, syphilitic osteitis of the skull, gunshot wounds, and many other types of disabling injuries. Frequently the orthopedic surgeon had taken advantage of occupational therapy and physiotherapy, and in some cases even vocational training. The proof



of the success of their treatment, as pointed out with pride by the clinician, was that the patient returned to gainful employment. Their work illustrated a broad conception of reconstructive surgery.

Reconstructive surgery is synonymous with industrial surgery, with the exception that the latter must likewise include all methods of accident prevention. I refer not so much to the surgeon engaged purely in accident insurance practice, but to the broad gauged surgeon responsible for the care of the employes in a great industry. An accident occurs, and at once the industrial surgeon must approach the case with *prevention* uppermost in his mind. First he must think of the best line of emergency treatment which will prevent infection, permanent disability or death; second, he must map out suggestions or methods to prevent a recurrence of a like accident. One excellent surgeon who has a large insurance practice offered as his objection to the American Association of Industrial Physicians and Surgeons, that there was too much talk about accident prevention. Another surgeon, who had been very active in stamping out typhoid fever in his community, remarked that a certain industry was a regular gold mine for him, as he received five or six cases of hand infection or one or two fractures from this concern every week. When I inquired if he had ever visited the plant to devise means of preventing this great waste of human energy and loss, not only to the men, but to the employer and the community, he expressed the opinion that that feature of it was none of his business. A spirit of prevention must invade the mind of every surgeon if *preventive surgery* is to take its place with *preventive medicine*.

After the emergency treatment and the attention to prevention is given, the industrial surgeon then becomes a reconstructive surgeon; his efforts are directed to the best surgical procedure to prevent or overcome threatened disability; to utilize those methods which will most rapidly restore function; to get his patient out of the hospital early and back on the job at some light occupation—the best type of occupational therapy—and finally, to return the injured man to work as an efficient employee. Even then his responsibility is not ended, for he must examine

the man periodically to assure complete rehabilitation.

Thus I feel that the term reconstructive surgery is justified as indicating that branch of surgery which deals with the maximum functional restoration of the permanently handicapped, and the follow-up of the case until a proper and satisfactory economic end-result is assured.

#### SIZE AND CHARACTER OF THE HANDICAPPED PROBLEM

This field of industrial and reconstructive surgery has been sadly neglected by the great leaders in surgery. It would seem that during the last forty years the chief attention of these men has been directed toward abdominal surgery, tumor pathology, gynecology, and other types of surgical diseases. With the war the attention of the surgical profession has been directed toward traumatic surgery and the best methods of preventing and eradicating deformities. Today we find many of these leaders engaged in traumatic surgery, the result of industrial accidents, applying their knowledge gained during the war to this new-old field in surgery.

Let us consider the size and character of the problem, to see if it warrants this special attention from the profession: From the industrial field alone, consulting statistics furnished by the Department of Labor in 1917, one finds that annually 875,000 men and women are disabled for more than four weeks, as the result of accidents sustained in industry; that annually 76,000 people suffer loss of members, and at least 200,000 are otherwise permanently disabled by industrial accidents; that each year 28,000 of our people are killed as a result of industrial accidents.

Mr. S. S. Riddle, of the Department of Labor and Industry of the state of Pennsylvania, in a specially prepared bulletin (1918) sets forth the size of this problem as follows:

"The casualties suffered by the army of Pennsylvania workers—estimated to average continuously 3,000,000 during the two years and a half from January 1st, 1916, to July 1st, 1918—amounted to 577,053, including 7,575 fatalities, according to accident reports submitted during that period to the Pennsylvania Department of Labor and Industry. This includes all accidents disabling for a period of two days or more.  
\* \* \* \* \* During the same period there were 3,798 industrial amputation cases of workers having lost arms, legs, hands, feet, fingers and toes. \* \* \*  
\* \* \* The total number of eyes lost through accidents

in Pennsylvania during that period was 1,157, with 29 men totally blinded."

The above figures deal with industrial accidents alone. Consider the great number of permanently disabled individuals, the result of accidents sustained at home, on the streets, on farms and in connection with the public utilities, which are not covered by the compensation laws. Already this year there have been over five hundred deaths from automobile accidents in the city of Chicago alone. It is a conservative estimate that at least ten times that number, or five thousand people, have been permanently handicapped, the result of automobile accidents in that city. It is said that the number of men who have lost legs or arms during the threshing seasons in the great wheat states of the northwest, runs into the thousands.

Four years ago a survey of all the crippled individuals in Cleveland, Ohio, was made, the total number found being 4,815 and this included injuries, deformities, or diseases involving the skeleton or skeletal muscles only. Of this number 49 per cent were under the age of fifteen at the time of the occurrence of the disability, while 43 per cent were between the ages of fifteen and fifty-nine years, or during the period of working life. Of this latter group, 40 per cent were due to accidents. A similar survey in every community throughout the land would undoubtedly reveal the fact that industrial accidents stand second as the cause of permanent disability.

Another factor contributing to the wastage of human life and energy on the part of industry and society, is the inadequate surgical care so often afforded these victims of accident. Too many industries practice a false form of economy by employing cheap, under-trained surgeons. This is too often true when insurance companies are responsible for the medical work; too often for the first few days or weeks following a serious accident, the injured person is under incompetent care. When serious complications develop the patient is rushed to a hospital and placed under expert care, in an effort to save his life. The life is saved, but the delay in rendering proper treatment results in a permanent handicap. Many injured, both from industry and from the streets, are admitted to the wards in our hospitals, and the immediate treatment or operation is usually performed

properly and well. This is followed by the daily dressing, but unfortunately, too often left only to the interne. For the remainder of the day, for weeks and weeks to come, the patient is left to his own devices. Lying there in idleness, with worry and melancholy his chief companions, is it any wonder that traumatic neuroses develop? Satisfied with a good surgical end-result, as usually interpreted, very little thought is given to the man's future usefulness.

Mr. A. Guinn James, County Court Judge under the Workmen's Compensation Act, in Bath, England, in a statement published in 1918, points out that in a large majority of the injury cases arising from accidents in mines and from machinery, which come before him, "the lack of proper and adequate medical treatment is simply appalling." He points out that many of these injured workmen receive the best of treatment in the hospital, but their after care is left to younger and less experienced physicians; that no attention is paid to massage or other forms of physiotherapy; that seldom are amputated cases fitted with artificial limbs; and criticizes the lack of co-ordinated care until the injured man is again able to work. "The result is often a stiff limb for life, and continuance of weekly payments from the insurance company, (probably for life) and the loss to the country of the man's earning powers."

With the exception of some of our large industries and a few far-visioned insurance companies, conditions similar to those described by this judge prevail generally in this country. A few industries salvage their disabled and make them efficient and independent. Some give these employees easy jobs where they can make a living, but the very softness of the job robs them of all incentive, and the bitterness engendered by dying ambition adds to their incompetency, so that they drift on to the scrap heap. Many concerns settle with their injured workmen when they are legally responsible, and then dismiss them; their disabled for whom they are morally responsible are scrapped without a settlement. These men, trained for certain occupations, who meet with permanent handicaps, are the waste products of our industrial life. Too often when employed again after their injury has healed they are ineffective, because they are thrust into a job without considering their phy-



sical fitness for it. Again, they are given the position of watchman, flagman, messenger and similar work, when with proper training their mental energy and physical capacity could make them entirely efficient in much more gainful vocations. Many of these disabled men and women for whom no employer feels responsible, drift from one job to another, constantly dropping to a lower level, until finally they relinquish all effort to work. These are the loafers, the beggars on the corner, the shoe-string merchants on the street, the poor, physically handicapped and mentally debased flotsam and jetsam of our civilization.

The cost alone of this great human wastage should cause every man and woman in this country to pause and think. In Pennsylvania the gross total of workmen's compensation awarded and paid for fatal and disability cases during two and a half years, amounted to \$16,917,000.00, and figures from other states would indicate that considerably more than \$100,000,000.00 annually is disbursed in payment of accident compensation claims throughout the United States.

These eloquent words from the pen of John Mitchell should stir every physician and surgeon in this country to greater effort to meet this problem of the permanently handicapped:

"We are casting valuable workers needlessly on the scrap heap. In my experience as chairman of the New York Industrial Commission, administering the Workmen's Compensation law, I am brought face to face every day with the tragic consequences of our failure to make some provision for restoring economic usefulness, self assurance and renewed interest in life to those victims of industry whose injuries have maimed or disabled them beyond all possibility of returning to their usual occupations. \* \* \* \* \*

For a time, workmen's compensation comes to the aid of the family; then these benefits are exhausted; the little savings of years are swallowed up; the unfortunate man is entirely cut off in the prime of manly vigor from the work he knows so well how to do. He sees no occupation open to him. \* \* \* \* \*

His special knowledge of working processes is gone to waste. He sinks under the weight of his misfortune—watching—the black shadows of destitution fall over his home."

I appeal to you—have we in the past attacked this great problem of the physically handicapped, the result of both accident and disease, with all our energies? Have we not been too content with solving the surgical aspects of this

problem, heedless of the all round processes of human salvage?

#### SERVICE LEAGUE FOR THE HANDICAPPED

I prophesy that within the next ten years every state in the union now having employees' compensation laws, will likewise enact laws and establish machinery providing for the rehabilitation of these permanently handicapped individuals. Already Rhode Island, Pennsylvania, California and Illinois have adopted rehabilitation laws providing for more or less limited efforts along this line. The Federal Government has enacted the Smith-Sears Bill, which deals with the vocational training of the handicapped from industrial accidents, by cooperating with state efforts. All of this is more or less "piecemeal" legislation, especially the latter law, as vocational training constitutes only about ten per cent of the problem. It is placing the cart before the horse, but nevertheless even this law indicates an awakened conscience on the part of the law makers.

In an effort to work out a practical solution of the entire problem of rehabilitating the physically handicapped, both from accident and disease, an organization has been perfected in Chicago during the last year, composed of leaders in industry and education, a large group of women representing the various social agencies, and a medical board of representative physicians and surgeons of the city. This is known as the Service League for the Handicapped. It has an executive committee made up of fifteen of the most influential business men, with medicine, education and safety engineering also represented. Its Board of Management is composed of delegates from almost every agency in the city dealing with some phase of the problem of the handicapped. Through its connections with the public school system, the universities and many industries, and through its own work shops which are now established, practical re-education of the handicapped for lucrative employment is made possible. It maintains an employment bureau which directly, or through the state employment agencies, is successfully replacing many handicapped individuals in industry. This Service League stands as a half way house between hospital, where the reconstructive surgery is done, and the future employment of the disabled, where his rehabilitation will be completed.

In a few of our Chicago hospitals occupational therapy, physiotherapy and social service departments have been established, and these are the agencies which enable the surgeon to extend his influence over the patient into the economic field. Already we recognize the need of a suitable convalescent center, where the patients after their discharge may continue convalescence under environments which stimulate further effort toward independence.

Thus far the Service League, simultaneously with completing its organization, has accomplished the rehabilitation of 260 permanently handicapped individuals, many of whom were absolutely dependent upon relatives, friends, or on the associated charities. A few were even beggars on the streets. At present it is caring for almost two hundred handicapped cases. The following case examples best illustrate the value of Reconstructive Surgery and the utilization of those adjuncts which assure complete rehabilitation of the physically handicapped:

*Case 1.* O. C., 19 years old, illiterate Polish boy, speaking very little English. He started to work as a miner almost as soon as he was able to lift a pick. In May 1917, a mine explosion crushed his left leg. Amputation performed at middle of thigh; in hospital six months; discharged with stump healed except a small discharging sinus, which the surgeon told him would heal shortly. Was not fitted with an artificial leg. Industrial Compensation Board allowed him \$1900.00. This money was turned over to his father and step mother, and the boy, with only a few dollars in his pocket, came to Chicago, where a sister was living. He was unable to locate his sister, but secured a room in a cheap hotel, and for three weeks vainly sought employment, but no one wished to hire a one-legged man. Other cripples lived in this hotel, who obtained their living by begging. In order to beg in Chicago, these individuals must procure a license from the city to sell shoestrings or lead pencils or other cheap merchandise, on the street. Most of them conceal the merchandise and do out and out begging, except when a policeman is in sight. Such a procedure is, after all, the licensing of begging. This patient, despondent and moneyless, was about to procure his license, when some one referred him to the Service League for the Handicapped. They sent him to my service at St. Luke's Hospital in January 1920.

Examination of the left extremity showed mid-thigh amputation, posterior scar, with a small sinus at the outer end of the scar. A probe passed into the sinus came in contact with roughened bone. The patient stated that this sinus had never healed since his discharge from the hospital. Cultures from the pus showed a mixed infection of staphylococci and pyocyanus. An x-ray of the stump showed the

lower two inches of the femur consisting of a sequestrum, surrounded by a honeycomb involucrum, so that the femur resembled an aborigine's war club. There were marked osteomyelitic changes in the cortex and medulla. The general examination showed patient considerably emaciated, but with heart and lungs, abdomen, genitalia and remaining extremities normal. Temperature varied from normal to 99.8; white blood count was 10,000, and the urine showed a trace of albumin and occasional casts.

*Treatment:* A re-amputation was performed, removing three inches more of the thigh. Long anterior and short posterior flaps were made. When the muscles were severed down to a bone, a cylindrical piece of involucrum about two inches long, and forming a cast of the femur, popped out of the wound. The femur was sawed through, two inches above the diseased area. Two Dakin's tubes were placed in the wound and the muscle and skin flaps closed. After treatment consisted of injections every two hours of 15 c. c. Dakin's solution into each tube, continued for ten days. During this period there was a small amount of pus discharged, but the infection rapidly cleared up. Massage started on the tenth day; light pressure on the end of the stump was started at the end of two weeks, and at the end of three weeks, heavy pressure. A temporary artificial limb was fitted at the end of four weeks, and the patient was allowed to walk with an end bearing stump at the end of five weeks. In the sixth week, just before the patient was discharged, he was one of two patients in the ward to develop facial erysipelas. He was quarantined, and was very sick for three weeks. In the ninth week he was measured, and the tenth week fitted with a permanent artificial limb. Because of his experience with a temporary leg, he was able to walk about at once without crutches or a cane. The physio-therapy department was the chief aid in obtaining this result.

During the patient's stay in the hospital the occupational therapy department taught him English and gave him various kinds of occupational therapy. He was anxious to learn photography, with a view of entering the operative end of the motion picture business. Books on this subject were procured, and many of his English lessons were from these books. On his discharge from the hospital at the end of ten weeks, the Social Service Department turned him over to the Service League. The League procured a job for him in a motion picture concern, developing films at night, for \$5.00 a night. In the afternoon he continued his study of English, and took up other studies through the assistance of one of the workers of the League. At the end of three months he was raised to \$6.00 a night. Recently this concern closed down, and this patient secured an excellent job in the same business in Kansas City. This boy was not only reclaimed—he was also Americanized.

*Case 2.* R. K., fourteen years old, American, while "flipping" freight cars fell under the wheels and had both legs cut off, the right twelve inches and the left ten inches from the hip joint. Excellent stumps were



obtained as the result of good surgical care in the Illinois Central Hospital, Chicago. After three months in the hospital this boy was discharged, but no effort had been made to teach him to use artificial legs. At his own request he left the hospital after dark, and was carried into his home the back way, so that the neighbors could not see him. For ten months this boy seldom went out of doors, except for an occasional automobile ride, when he was carried out the back way. He was very sensitive about his condition, and his parents were heart broken. The mother frequently remarked that she would much rather her son had been killed. The Service League became interested in this case, and referred him to my service at St. Luke's Hospital.

Examination showed excellent stumps of the size mentioned above. Patient would flinch and complain of pain when stumps were handled. The physio-therapy department gave daily massage, and he was taught to make pressure on the ends of the stumps. At the end of ten days he was fitted with short temporary peg legs, and a month later these were lengthened so that they were approximately two feet long. By means of these temporary legs this boy was able to walk, first with crutches, then with a cane, and at the end of four weeks could walk alone. On his discharge from the hospital this time the boy entered his home at the front door. During his stay in the hospital he was encouraged to take up his school work once more, which he had decided to drop permanently. At the end of four months he was fitted with permanent artificial limbs of rather short length, but sufficient to make him 5 ft. 2 in. tall. He can walk alone on these legs, but when he leaves the house he uses canes. He returned to school this fall.

*Case 3.* J. R., 23 years old, American, machinist by trade, enlisted in the "Princess Pat" Regiment of Canada in 1914, and had both legs blown off by a shell just above the knee joint. He was given excellent treatment in Canada, and became an instructor in vocational training of other disabled soldiers. Early in 1920 he returned to Chicago and sought employment. He was unable to find remunerative work sufficient to take care of himself and his wife, whom he had secretly married upon his return. His wife obtained work, and this patient became very despondent over his inability to secure employment. Finally he was referred to the Service League. The League endeavored to secure training for this man as a safety engineer. He was very bitter over the fact that there was no reciprocity between Canada and the United States for the soldiers from Canada who came to the States, and vice versa. Sufficient attention was not paid to the mental state of this patient. He grew discouraged and gave up all effort to become a safety engineer, and again sought employment on his own hook. One morning we read in the paper that he had committed suicide because he could no longer allow his young wife to support him, and no one seemed to care for a disabled soldier. This case illustrates the

need of an organized agency to care for many of these handicapped individuals.

*Case 4.* H. W., a boy 12 years old, American, one of six children, parents very poor. Was born with congenital absence of entire arms. On the right side there was a small protuberance, and a slightly larger protuberance on the left, but no sign of an axilla. This boy was a pupil at the Spaulding School for Crippled Children, in Chicago, where he had attended for four years. He could do a great many things for himself, such as opening a door by grasping the door knob between his cheek and shoulder. He was a good writer, holding the pencil between his cheek and right shoulder. He wrote on the typewriter, using a long stick held in the same way. This boy was referred to me in June of this year. An x-ray examination showed a rudimentary humerus three inches long on the right side, and five inches long on the left. There was a slight Glenoid Fossa, but the shoulder joints were imperfectly formed. The humerus on both sides seemed closely united to the scapulae. The Deltoid muscle could be outlined, but the biceps on both sides were completely absent.

Dr. John Porter was consulted, and he agreed with me that short stumps could be made by a plastic operation. Two of the best artificial limb men in the city were consulted, and they decided that artificial arms could be attached to these short stumps, if made. I operated on this boy in July of this year, doing first the right arm, and three weeks later, the left. An incision was made from a point where the anterior angle of the axilla should be, down the side of the chest to a point three inches below the rudimentary humerus, outward, backward and then upward to where the posterior angle of the axilla should be. The humerus was found connected with fibrous tissue to the scapula. This was dissected loose up to a point where the humerus seemed to fuse with the glenoid fossa of the scapula. The skin was dissected back over the anterior aspect of the chest, exposing considerable of the pectoralis major muscle. The pectoralis major was split from its insertion downward through its middle portion, and about four inches of the outer half of the muscle freed, its insertion remaining intact. This muscle was sutured over the anterior aspect of the humerus in the place of a biceps, thus forming with the deltoid muscle, a well rounded stump. The lateral flaps of skin were sutured from the axilla down to the end of the stump. It was a very difficult procedure to form a new axilla and close in the denuded area on the chest, but this was accomplished by a plastic flap from the posterior chest wall forming the axilla, and a plastic flap from the anterior chest wall closing in the remainder of the denuded area. The operation on the left side was similarly performed, except a larger amount of the pectoralis major was utilized, and the small denuded area in the axilla was finally closed by later transplanting a prepuce from a circumcision case.

This patient now has a 3.5 inch stump on his right side, and a 5.5 inch sump on his left side, which he

can abduct about 35 degrees and can raise anteriorly about 25 degrees. Through constant attention from the physio-therapy department of the Spaulding School, this range of motion is gradually increasing. He can grasp a heavy stick under both stumps, and we feel confident will be able to wear and utilize the artificial arms which are now being prepared for him. The arms will at least make him look like other boys, and he can hardly wait to have sleeves made in his shirts and coats, something which he has never had. He shows excellent talent as a cartoonist, and is planning to take up this work. I believe he will always draw best by grasping the pencil between his cheek and shoulder, and do not plan to change this method. He should be able to typewrite better by using his artificial arms; he will also be able to carry things. This boy's father was planning to put him in a museum or show, but now the boy is determined to complete his education and become a cartoonist. This is an excellent example of Reconstructive Surgery.

*Case 5.* B. C., 24 years old, a Polish boy. When seven years of age, while playing on the railroad tracks, was run over by a switch engine and lost both legs just below the hip joints. Disarticulation amputation performed on both sides. Goes about by sitting on a little platform on roller skate wheels, pushing himself with his hands. He was taken up by the Board of Education a few years ago, and arranged to complete his education through the eighth year. Was referred to the Service League for the Handicapped from the Board of Education. Work was found for him at the Raleigh Doll Factory, first at \$20.00 a week, then \$23.00 a week, and now with overtime he frequently makes \$35.00 a week. There is no elevator in the factory, and this boy negotiates four flights of stairs morning and night.

I have examined this boy, and he can be fitted with artificial legs which he could use by the aid of crutches. They would be very clumsy, however, and he is so used to his platform, and can travel about so rapidly on it, that he refuses to attempt the legs. Happy, cheerful, always smiling, "Sunny Jim" would be a most appropriate name for him, but he says everybody calls him Benny, because he is such a little fellow.

*Case 6.* D. A., male, 25 years old, Norwegian, has a congenital curvature of the spine. At the age of seven he had infantile paralysis, which left him helpless in the lower extremities, which have never developed. His only way of locomotion was to creep. He had incontinence of urine. Three years ago his mother brought him to this country, and two years ago he came to Chicago, where he has a sister living. He had never worked. The Service League took up this case eight months ago. He was fitted with braces which enabled him to stand, with the aid of crutches. Shortly after assuming this upright position his incontinence disappeared. He was taught basket making in his home by the "Shut-in" department of the League. About five months ago he was brought to the work shop of the League in a taxicab. A week

later he appeared at the work shop in a tricycle which he had designed himself and which neighbors helped make for him; he propels this by hand. He lives eight miles from the work shop, and it takes him two hours to make the trip, but since then he has never missed a day being at work at the shop. He is now doing piece work six hours a day, and his pay averages \$14.50 per week. Thus far we have found no means of bettering this boy's physical condition, but he has been changed from an absolutely dependent man to an independent worker. A motor is now being designed for his tricycle, which will enable him to get about more rapidly, and he is planning to enter some business of his own.

*Case 7.* D. R., male, American, 25 years old, with a spastic paraplegia, the oldest of thirteen children, five living. His father was killed seventeen years ago. Three years ago the mother became paralyzed. This boy had never worked because of the halt in his walk and his defective speech; he had never been given a chance. The Service League referred him to Dr. N. C. Gilbert, who recommended work and speech training. The boy has worked for three months in the League shops at rug weaving, and there is at least 30 per cent improvement in his hands, and his speech is greatly improved. His present earning capacity is \$12.00 per week.

*Case 8.* R. S., a man 63 years old, a mail carrier, fell fourteen feet three years ago, sustaining three fractures of the right shoulder joint. Had not worked since, because of pain in shoulder and inability to abduct his arm more than 45 degrees.

X-ray examination showed good repair in all the fractures, but the tuberosity of the humerus had evidently been fractured off and united with an upward displacement of about 0.75 of an inch. On abducting or raising his arm the displaced tuberosity would impinge under the acromion process. By forcing it the tuberosity would slip under the acromion, but would cause great pain. This case was referred to me in April 1920. Operation consisted of chiseling off about one-half of the tuberosity. After the wound had healed, this patient was able to abduct and raise his arms completely. Subsequent treatment consisted of massage and exercises, until in July he was discharged with a useful arm. Before the operation he could not sleep, and was a nervous wreck over worry about his arm. He is now, after three years, a productive citizen.

*Case 9.* F. C., a Polish boy of 18, quit school in the sixth year and went to work. Four years ago, while pushing a truck, he collided with another truck and noticed a slight pain in his arm, near the right shoulder joint. On attempting to raise the arm found it was helpless, but there was very little pain present. X-ray examination showed a pathological fracture through the neck of the humerus, and a large bone cyst present. I operated on this case and found a bone cyst without trabeculae, the walls of which were of egg-shell thickness, made up chiefly of periosteum. The head of the humerus, about one-half inch in thick-



ness, was not involved. A bone transplant six inches long was removed from the tibia, and was fastened in a groove in the shaft of the humerus, the upper end being fastened in the head of the humerus by gouging out a small groove with a chisel. The muscles were resutured about the transplant in approximately their normal position. The arm was held in a cast at right angles to the body for two months, when massage and passive movements were begun. At the end of four months active movements were permitted, and at the end of eight months this boy could raise his arm above his head. By examining the series of x-ray pictures, one sees an excellent proof of the action of Wolf's Law,—the molding and shaping of the graft to the contour of the normal humerus. During this boy's convalescence he was stimulated to take up certain studies, and he became greatly interested in business courses. After his recovery he returned to work as a packer, but went to night school. He is now 22 years of age, and is a bond salesman.

The next three cases illustrate the value of these therapeutic adjuncts in traumatic neuroses:

*Case 10.* A man, American, age 24 years, fell ten feet on a cement floor injuring his coccyx. After three weeks the surgeon removed the coccyx. When the case was referred to me, this boy had not worked for a year. He complained of numbness in his legs, weakness, inability to walk in an erect position, sleeplessness, and his general appearance and statements indicated a mental attitude of resignation to a state of permanent disability. I placed this man in the hospital, and after three days of careful observation, diagnosed a traumatic neurosis. Treatment consisted of massage and light exercises for two hours a day, and later for four hours a day, and work in the occupational therapy shops, first for two hours a day and later for four hours. This man became interested in the jig-saw, which he manipulated by foot power, and it was his delight to make many scroll designs. At the end of a week he said the numbness and pain in his legs was better. At the end of ten days he went to the park with one of the other patients, who was posted to try and induce this man to row a boat. He rowed the boat for half an hour the first day, and for the next three days was eager to go to the park, and the last day rowed a boat for two hours. At the end of two weeks in the hospital I held a private conference with this patient, pointing out to him that there was absolutely nothing wrong, and that his numbness and pain and sleeplessness had been the result of a mental state. He returned to his old occupation the next day, and has worked ever since.

*Case 11.* M. R., a man aged 45, laborer in a stone quarry, married, with four children. Entered St. Luke's Hospital in the service of Dr. A. E. Halstead, in August 1919. Two years previously, while blasting rock, a piece of rock fell and struck the back of his right hand. No fractures were sustained, but the hand was badly contused, and remained swollen for several weeks. It was so black and blue that one doctor suggested amputation, fearing gangrene. The

patient refused amputation, but from that day he considered the condition very serious. For two years he had held this hand perfectly rigid. It could not be flexed nor extended, neither could it be rotated, although all swelling and sign of injury had disappeared long ago. Dr. Halstead diagnosed traumatic neurosis, and knowing my interest in these cases, let me experiment with the case.

The first day I spent in obtaining the patient's confidence. The second day I injected the hand and forearm with small amounts of salt solution, using a large sized hypodermic needle. This was painful, but had the psychological effect of creating a little movement in the fingers on the fourth injection. The next day, under gas anesthesia, I found I could manipulate the hand in all directions. It was forcibly flexed and bound down to this position. When the patient awakened I told him over and over, that I had cured his hand. The next day he was so confident that he could use the hand that I removed the bandages and put him to work in the occupational therapy shops. On the sixth day, after two days hard work in the shop, he was discharged with a normal, serviceable hand.

*Case 12.* L. L., male, American, 40 years old, injured two years previously by a plate glass window falling and cutting a deep gash in his forearm just below the elbow joint, severing the ulnar nerve. He had not worked since the injury. The laceration was sutured without the nerve being repaired, and paralysis resulted. Six weeks later another surgeon opened the wound and repaired the nerve. A year later one of the best surgeons in St. Louis made a second incision over the ulnar nerve, removed considerable scar tissue, removed the nerve from the ulnar groove and buried it in normal muscle tissue. In August of this year this patient was sent to me by the U. S. Employees Compensation Board, which had paid him compensation all this time. His chief complaint was of inability to close his fourth and fifth fingers, and excruciating pain in the forearm about the scar whenever he tried to work or use the arm. It was on account of the complaint of pain that he had remained away from work.

The examination showed that he could flex the fingers about fifty per cent, sufficient movement to rule out paralysis. There were areas of anesthesia in the forearm, but on repeated examinations made at different times, these areas were not constant.

This patient was put to work in the occupational therapy shop, but immediately complained of pain in his arm. After gaining his confidence I operated on him, simply dissecting away the two scars, which had an ugly appearance, and making a nice linear scar. This was done under gas anesthesia, and as soon as he awakened he was told not only by myself but by the internes and nurses, that I had discovered the cause of his trouble, and removed it. The next day he greeted me with, "Doctor, you have turned the trick; I can use my fingers perfectly." After four days he was given light occupation, and on the seventh day was put to work in the occupational therapy shops.

I informed him that he could not return to his home in St. Louis until he was able to do a day's work in the shop. The next day he performed a full day's work, and at the end of two weeks was discharged, completely cured. This man returned to his trade as a carpenter a week later, and I received a letter from him recently saying he had not missed a day from work.

*Case 13.* This is an arthroplastic on a right temporo-maxillary ankylosis of five years duration, following a blow on the chin, with fracture of the condyle followed by an osteomyelitis. This boy was very melancholy over his condition. Following the Murphy operation of removal of 0.75 inch of the neck of the mandible, with a facial flap from the temporal muscle, I obtained a perfect result with complete opening of the mouth. A facial paralysis developed one week after this operation. Massage and facial exercises were given daily, and occupational therapy was used to overcome this patient's despondency. He was discharged from the hospital at the end of three weeks, but reported back for his massage. Today, four months after the operation, the facial paralysis has completely disappeared, and the boy has again returned to his school work.

Many other case examples of amputations could be given. These are old amputations which had never been fitted with artificial limbs. They were either beggars or holding mediocre jobs. Through the efforts of the Service League artificial limbs have been obtained, and these unfortunate persons have been placed in lucrative positions. One case of a lady, fifty years old, a trained nurse, lost both her legs just above the ankles ten years ago. She had become dependent. Her stumps were sensitive, and for this reason she would not attempt artificial legs. Massage was applied until she was convinced that the stumps were no longer sensitive, then two artificial legs were obtained. By the end of two weeks this woman, who had gone on crutches for ten years, was walking about only with the aid of a cane. Four weeks from the day she arrived in Chicago, through the assistance of the League she was placed in a position in one of our hospitals, assisting in the surgical dressing department.

I have had several cases of chronic osteomyelitis with large discharging sinuses, in patients who had ceased to be under the attention of any physician. These patients were neither physically nor mentally able to work. One of them, a man 45 years old, with a wife and five children, recently came under my care, four years after his injury, with an old osteomyelitis of the tibia, and

a large ulcer over the lower extremity. He had drawn \$12.00 a week from the insurance company, and his wife was forced to work to support the family. This is an example of many of the old chronic cases which have become pensioners on insurance companies. Three different efforts, at large expense, had been made by this company to clean up this case, but each time it was a failure. Naturally it seemed cheaper to pay this pension than to waste any more money on operations.

A radical cleaning out of the diseased bone, with complete dissection of the ulcer, followed by Dakin's Solution, is rapidly cleaning up this condition. The occupational therapy department has put new interest in life into this man, and he can hardly await his discharge from the hospital in order to return to work.

These cases demonstrate that reconstructive surgery does not differ from any other type of good surgery, but they do illustrate that if the surgeon desires to obtain a good economic end-result, he must use such therapeutic adjuncts as physio-therapy and occupational therapy, and must have close contact with some agency which will obtain employment for and supervise his case until rehabilitation has been completed.

In order to salvage the human scrap heap in every community, our profession must awaken to its responsibility. Physicians must take the lead in establishing these prevention and reclamation services.

#### DISCUSSION

DR. A. A. LAW, Minneapolis: Personally it has rarely been my privilege to hear such an interesting, philosophical, and instructive paper so splendidly presented. I think every one of us is more or less familiar with the different efforts that have been made by great corporations to rehabilitate their injured employees. Since the Great World War we are all realizing the necessity of reeducating and helping the wastage of that war. I saw in the great French Facio-Maxillary Reconstruction Hospital at Beauvais, soldiers who had received terrible wounds, in some cases their faces were literally blown off. There was nothing more encouraging than to see the reconstructive surgical work done here by the surgeons and by the dentists in this hospital. The prosthetic, cosmetic and mechanical work done was remarkable. These Facio-Maxillary surgeons restored these terrible remnants of war to some semblance of human appearance. The excellent surgical and prosthetic work done by these surgeons showed us that not only did they rehabilitate these men physically but they built up their morale which they needed more than any-



thing else to permit them to go back into the society of their fellows without feeling they were monstrosities and a burden to themselves and to other people.

In the Hospital Center of Allerey, Saone et Loire, with a capacity of 25,000 beds, as soon as many of the men could be turned out, they were sent to a "Convalescent Camp" where efforts at rehabilitation were begun. They were put through exercises and through calisthenics and their morale was built up. One of the necessary things in war is that the wounded soldier must be reeducated and have instilled into him the morale which gives him what the military man calls "The will to fight". As a result of this training it was possible to return eighty per cent of the wounded back to the fighting lines.

This summer in France and in England I studied some of the efforts that are being made by these countries to rehabilitate these men. The United States government, recognizing the necessity for this rehabilitation, has done and is doing a wonderful work; this is centralized in the Public Health Service which is responsible for the work being carried on and where men are being reeducated and retaught mentally and physically. Dr. Mock has emphasized the necessity of the morale of these men being built up, of reteaching them to do things which put them in a position to successfully compete with their fellows who are more fortunate than they themselves.

It still remains for most great corporations to put into effect the lessons they have learned from the United States government. The most dramatic part of Dr. Mock's paper was the presentation of the large number of economic and industrial injuries which occur in this country annually, he has shown us how very large this is, in comparison with the injuries resulting from the late war. The vast number he mentioned is enough to make us pause and think, fortunately some of the great corporations are doing the same and are seriously taking this matter up. They are putting in social services, installing a corps of trained doctors, surgeons and nurses into their great organizations, teaching them that following industrial injuries their employees must be reeducated, and emphasizing the enormous economic saving resulting from that reeducation.

We are glad to hear that so many states have appreciated the necessity of reeducating men following industrial injuries and have formulated laws to that end.

We have Workmen's Compensation Laws in most of the states, some of which are good, some bad, many of them in the transition stage. It remains for the government or state to control and put into these Workmen's Compensation Laws a clause making it imperative upon the state or upon corporations to reeducate men who are injured while in their employ.

DR. E. S. JUDD, Rochester: We seldom, if ever, heard of reconstructive surgery before the war, and yet as Dr. Mock suggests, this class of surgery does not differ from the emergency and reparative surgery of the past century. With the tremendous amount of

this kind of work that has come as the result of the war, a very great advance has been made by Dr. Mock and others who are devoting much time to its many problems. It was an interesting experience to visit some of the army hospitals a year or more ago and see three hundred or more peripheral nerve injury cases under the care of one surgeon. This certainly was more material of the kind than could be gotten together in any other way. It gave these surgeons and their staffs an opportunity to work out the best methods to follow. It soon became known that an end-to-end suture of a peripheral nerve was the best method of procedure, and that where it could be accomplished, in the majority of cases there would be a restoration of function. I was also interested to find that some of these surgeons could estimate fairly accurately from the nerve involved about when the return of function might be expected.

And from this great amount of material much progress can be expected from such work in the substitution of muscle function. I believe that at present in cases of musculospiral injury, if the destruction is so extensive as to take away a considerable portion of the nerve, it is better to restore the function by substituting some of the muscles of the forearm than to attempt to graft nerve tissue or wait for it to regenerate. In many traumatic as well as congenital and paralytic deformities of the extremities, in which there are some muscles capable of functioning, these operations are being most satisfactorily carried out.

Those having charge of wards of osteomyelitis or empyema patients, from the data which has been collected from these cases, will undoubtedly have improved the treatment so as to make a better convalescence and bring about a more complete restoration of function.

While the points I have mentioned regarding the technical phases of the treatment must be regarded as important, at the same time they are almost secondary to the extension of the care of the patient by the surgeon into the economic end result. And so far as I know this part of the work has not been carried out systematically until lately. Dr. Mock certainly deserves great credit for his part in the work, and the cases he has reported here show what can be done.

While it may be that the reclamation services will at first be confined to certain cities, I fully agree with Dr. Mock that he has shown by his work in Chicago that a reclamation service is feasible in any community.

DR. H. WINETT ORR, Lincoln, Nebraska: One is tempted to applaud rather than discuss this excellent paper of Dr. Mock.

There are one or two points I would like to refer to briefly. We have been accustomed to think that death is the ultimate calamity for every human being. I have seen even in children death come as a welcome relief at the end of a life of disability. A thing we do not ordinarily appreciate, and perhaps has not been sufficiently emphasized, is that a large percent-

age of all disability rests upon the shoulders of some member of our profession. This is true particularly of surgeons and specialists. The custom has been common to blame the general practitioner for failure to get patients to the specialists in time. We do not often think that every case of hunchback is a neglected patient. There should never be a hunchback. Every case of tuberculous lesion of the spinal column should be treated early to prevent deformity. The same is true of infantile paralysis and of tuberculosis of the hip.

One of the able speakers this afternoon stated that the future of surgery to a large extent rested upon more accurate methods of diagnosis and better technique for operating. He stopped there. He should have added that the future of the patient rests largely upon better postoperative care.

We were fond of saying before the war that we as a nation, in case we were attacked or threatened, would spring to arms over night and crush the enemy. When we sprang to arms at the proper time we saw how flat footed, stiff jointed and otherwise crippled up we were. We could not spring at all. As a matter of fact, the surgeon-general in a report just issued states that 600,000 mechanical difficulties were found in the examination of those who were drafted, and of these 600,000, 22,000 were barred from military service on account of bad results after fractures. These are good things for surgeons to think about. I want to use an illustration from military experience.

In the treatment of compound injuries of the upper arm and elbow, it was my privilege in one of the hospitals abroad to have seen 700 cases that came in from the front with their arms in straight Thomas splints, not pronated. Every such arm, no matter how badly injured was flexed at the elbow and the hand supinated. We are greatly indebted to Sir Robert Jones, of Great Britain for what he has taught us in this regard. One of the fundamental principles of reconstructive surgery is that all these things can be settled on principle. We get too much in the habit of dealing with patients as individual problems. We should remember the principles that will help to secure relief for all patients.

One point I desire to emphasize is that badly crippled patients must not be considered hopeless. Almost any patient can be relieved, no matter how severe the disability may be when you begin, or how great it is when you finish. If he can be relieved, you often start him on the way towards the reclamation that Dr. Mock has spoken of.

DR. MOCK (closing the discussion): It is surprising how readily laymen grasp the idea of reclaiming the handicapped when you present principles to them. I would suggest that as you go home you appeal to your business men, your Chambers of Commerce, and your other civic organizations about the possibilities of reclaiming the great human scrap-heap in your midst. You will be gratified by their response.

## SOME UNSETTLED PROBLEMS IN THE MANAGEMENT OF RENAL TUBERCULOSIS\*

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Looked at broadly, the development of our knowledge of renal tuberculosis within the last ten years has been satisfactory. The relative frequency of the disease, its accurate diagnosis and its satisfactory operative treatment have been developed progressively and soundly. Perhaps the improvement is nowhere better shown than in the operative mortality. Prior to 1900, the mortality of nephrectomy for tuberculosis as reported from the great European Clinics was at least 25 per cent. In the decade between 1900 and 1910, the operative mortality of the leading operators in this country was not above 10 per cent, while in the decade from 1910 to the present time, the mortality in the great clinics has fallen to between two and three per cent. Considering the technical difficulties of the operation of nephrectomy, the proximity of important structures including great blood vessels, and the general rather poor condition of these patients, this is a highly satisfactory showing.

Almost we might be satisfied if we did not turn our attention to the study of the end results. But the study of the results in several large series of cases taken from various clinics where the results are known after a lapse of years shows that we cannot yet rest from our labor. Roughly speaking, it shows the following situation. Of the 97 to 98 per cent of the cases who leave the hospital after nephrectomy for tuberculosis, about 25 per cent die of urinary tuberculosis. Of this 25 per cent, one-half die within the first two years and the balance within five years.

It is to this group of cases and particularly to the 10 or 15 per cent who die within the next two years following operation that I particularly want to draw your attention. Clearly these people must either (1) have had tuberculosis of the remaining kidney though unsuspected, or (2) they must have developed it very promptly after operation.

\*Read before the Southern Minnesota Medical Association, Mankato, November, 1920.



# I. THE EVIDENCE UPON WHICH THE DIAGNOSIS OF UNILATERAL DISEASE MUST BE BASED

For the moment I will exclude the cases in which bilateral tuberculosis is known to exist and yet in which operation upon the worse of the two kidneys is thought desirable. Confining myself therefore to the cases in which it is believed at the time of operation that the tuberculosis is limited to one kidney, that opinion must be based upon the following reasoning:

1. Evidence may be collected to show that the non-tuberculous kidney is sound in all respects. In order to do this we must collect the evidence of normal urine and good function.

2. We must believe that though the remaining kidney is not sound, it is not tuberculous. In this group of cases there are three general types of trouble, (a) the toxic nephritis of Alberman, (b) infection of the kidney with some organism other than the tubercle bacillus, and (c) chronic nephritis.

(a) *Toxic nephritis.* It is my impression that this condition was first carefully studied by Alberman. At all events he called attention to the fact that in the presence of unilateral renal tuberculosis there was occasionally found a condition in the other kidney which he described as toxic nephritis. It is characterized by the presence of albumin, of casts, generally, of pus and, occasionally, of blood, but the urine is always free from evidence of infection and particularly the tubercle bacilli. He demonstrated experimentally on animals that the feeding of kidney substance would produce a picture similar to that described, a condition which rapidly disappeared after the withdrawal of the abnormal diet and which, in his patients, rapidly disappeared upon the removal of a tuberculous damaged kidney. In my own experience, cases which I could demonstrate beyond doubt to be of this type have not been common, but I have seen a sufficient number which correspond in every particular to satisfy me that the condition exists. On the whole it has, I think, received less attention than the careful work of its sponsor deserved.

(b) *Infection of the kidney with organisms other than the tubercle bacillus.* In my own experience this condition has not been common. It has on the whole been very striking that the presence of a tuberculous infection in the uri-

nary tract tended to discourage other types of infection. This I continue to believe in spite of a recent paper by Barney tending to show that in the presence of urinary tuberculosis other organisms are commonly found in the urine. The mere presence of other organisms by no means proves infection and the study of a pretty large number of cases has shown the striking absence of mixed infection in the vast majority. On the other hand, it is a possibility which must be entertained. Of the organisms which may be found, the colon bacillus is the most common and we shall have what is probably accurately described as a colon bacillus pyelonephritis on the side opposite to that showing tuberculosis. As a rule, the function of these kidneys is relatively good, but they are not likely to show improvement after the removal of their fellow upon the opposite side. In fact, the extra strain thus thrown upon them may well cause suspension of their function and make operation exceedingly hazardous.

(c) In order to make this list complete we ought perhaps to include chronic nephritis, though as renal tuberculosis is notoriously a disease of the first half of life, chronic nephritis has, in my experience, been a rare complication. The diagnosis of chronic nephritis should present no grave difficulties, at least no graver than those present under other circumstances.

Having demonstrated the apparent soundness of the remaining kidney, or the presence in it of any of the above described conditions, can we say with reasonable certainty that our knowledge is complete? Unfortunately the answer to this question is in the negative. There is no method now at our disposal which will enable us to diagnose "closed" tuberculosis, by which I mean not that form of tuberculosis of the kidney from which closure of the ureter has resulted, but those tuberculous lesions of the kidney which are contained entirely within the renal parenchyma and communicate at no point with the renal pelvis. These cases undoubtedly exist. They, equally undoubtedly, show a urine indistinguishable from the normal or within normal limits.

The possibility of diagnosing renal tuberculosis depends upon the demonstration of two factors: (I) the presence of inflammatory reaction, that is to say pus with or without blood, and (II)

tubercle bacilli. The demonstration of either of these factors alone does not prove tuberculosis. It is notorious and has been verified by many observers that tubercle bacilli may appear in the urine without a lesion of the kidney. It is, of course, true that pus in the urine without tubercle bacillus cannot be regarded as a demonstration of tuberculosis. Many years ago Alberan, while at work on the problem of toxic nephritis, attempted to show that in "closed" renal tuberculosis some slight abnormalities of urine always existed but he was only able to show the very constant presence of small quantities of albumin, a demonstration which is quite insufficient to a diagnosis. It therefore follows that though we may find an apparently normal kidney on one side or a kidney showing evidence of a lesion interpreted as toxic nephritis we are still unable to say with scientific certainty that this kidney has not a lesion, and an active one, produced by the tubercle bacillus.

What importance shall we assign to this hole in our diagnostic accuracy? If we take into consideration the existing knowledge of the natural history of tuberculous lesions of the kidney we must almost inevitably conclude that the presence of a lesion in the remaining kidney will lead inevitably to a fatal issue. Evidence is at the present time, lacking to show that a tuberculous lesion in the kidney ever heals except by removal of the kidney whether by nature (autonephrectomy) or by art. A careful study of the development and propagation of tuberculosis within the kidney such as was recently published by Crabtree<sup>1</sup> makes us all the more willing to assume the possibility of healing. Some very recent work by Forni<sup>2</sup> may prove of interest in this connection. He has apparently shown that if tubercle bacilli are introduced into the kidney and the kidney on the other side is immediately removed, the outlook for the infected kidney is very much better than if the kidney on the other side is allowed to remain. This is, of course, similar to the results alleged to have been obtained by the removal of the worse of the two kidneys. My experience, however, with this latter procedure has been sufficient to make me skeptical in regard to its utility, and I do not at the

present time intentionally remove one of two tuberculous kidneys. I regret that I am unable to suggest a method by which we can avoid overlooking these closed lesions but I think it important to call attention to this ever-present possibility and to point out that the improvement in our results would be greatly aided by further study of this question should it result in its solution.

## II. THE DEVELOPMENT OF TUBERCULOSIS IN THE REMAINING KIDNEY AFTER OPERATION

Of the patients who after nephrectomy, die within a few years, of tuberculosis of the remaining kidney, there is a sufficient group in which the demonstration of the original soundness of this kidney was sufficiently complete to make us at least consider seriously the possibility of postoperative infection. I take it that we all of us believe that in the majority of cases the infecting agent in renal tuberculosis is blood-born. Now clearly the conditions attending operation are such as to make the driving of bacilli, perhaps in quantity, into the blood stream, a not remote possibility and the development of an occasional case of miliary tuberculosis following operation makes it clear that this does, in fact, occur. Furthermore, there is a group, of cases which, following nephrectomy show high temperature, much increased pulse rate and the other evidences of a sudden acute infection. This rapidly subsides; there is no clear evidence of infection with any of the organisms commonly introduced from without and we might not improperly regard them as evidence that there was driven into the circulation at the time of operation either numbers of tubercle bacilli or their toxic products. From this I think it follows that in a certain number of cases we must expect renal tuberculosis of the remaining kidney as an unavoidable consequence of the operation. On the other hand, it is not clear to me that there is anything which we can do to avoid its occurrence and it must therefore be charged off to depreciation.

Now there is another possibility of infection occurring after operation or at least after the patient has come under observation, to which I want particularly to call your attention. I refer to the possibility of infection of the remaining kidney as a consequence of the measures taken to arrive at an accurate diagnosis. Diag-

<sup>1</sup>Archives of Surgery, November, 1920, Vol. 1 page 581.

<sup>2</sup>Centralblatt für Allgemeine Pathologie und Pathologische Anatomie, October, 1920, Vol. 31, No. 3, pages 66 and 67.



nosis of sufficient accuracy to warrant operation depends inevitably upon cystoscopy and ureteral catheterization. The majority of these patients have tuberculous lesions of the bladder secondary to their renal disease. In many of them the technical difficulties of the examination is great and trauma nearly or quite unavoidable. Were we dealing with any other form of infection of a unilateral type we should be gravely conscious of the danger of infecting the remaining sound kidney. This possibility has, I think, been, to some extent, overlooked and though it may be regarded as inevitable to accurate diagnosis we must overhaul our methods and be sure that they expose the patients to the slightest possible danger of infection. Some years ago I called attention to the fact which I was then, as now, unable to satisfactorily explain that, in cases particularly of long standing unilateral renal tuberculosis, the ureter on the sound side commonly showed a definite and even considerable degree of dilatation. It has been suggested that this phenomenon may be due to the hypertrophy of the bladder wall consequent upon frequency of urination and that with the hypertrophy of the fibers surrounding the ureteral orifice, increased resistance to the descent of the urine is produced. What ever may be its cause it is a fact that should not be overlooked because we have here some degree of renal and ureteral retention, conditions which we know are commonly antecedent to infection. My own knowledge does not permit me to say whether or not these cases do in fact show a greater tendency to infection of the remaining kidney after operation but the point is at least worthy of further investigation.

At this point the question may be raised whether or not infection with the tubercle bacillus ever ascends from bladder to kidney. This point does not seem to me as yet clearly settled but the pathological evidence seems to show that it does occur in the cases in which unilateral tuberculosis is converted into bilateral tuberculosis without the intervention of the surgeon. Most well-informed pathologists believe it to be a definite possibility and the clinician is in no position to deny the soundness of their view. From this observation it appears to me to follow that we should surround our instrumental study of these patients with the

greatest precautions and above all we should avoid any multiplications of cystoscopic examinations beyond the absolutely necessary. This point does not seem to me to have received sufficient attention. I was struck by a paragraph in a recent article from a most skillful surgeon definitely advising multiple cystoscopies in the diagnosis of this condition. With this advice I must take issue. By all means let us make such examinations as are necessary but only with the full realization of the fact that each examination is a definite trauma and that we cannot say at what point fatal damage may be done. If we study these patients to a full extent by general physical examination, careful study of the urine and roentgenological evidence, we can, in most cases, make a diagnosis of renal tuberculosis without cystoscopy. We must then determine whether or not the patient has a non-tuberculous kidney concealed about his person and whether it is functionally capable. It should be possible in most cases to obtain this evidence as a result of one examination of the bladder. Beyond this we cannot go; without the cystoscopic verification our whole procedure is in the air but I would warn against multiple, unnecessary or ill-advised and roughly executed examinations. They may well be at the bottom of some of the cases which rapidly develop disease of the remaining kidney and die as a result. It is my present opinion that by attention to this detail we shall do more to diminish the number of people belonging to the unfortunate 10 or 15 per cent not importantly benefited by operation.

#### DISCUSSION

DR. WILLIAM F. BRAASCH, Rochester: This Association is certainly to be congratulated on the privilege of listening to the able paper of Dr. Cabot. It represents an experience of many years in dealing with this subject, of which he is one of the acknowledged leaders in America.

I wish to endorse his recommendation that every effort should be made to lessen the pain caused by cystoscopy of patients suffering from renal tuberculosis. This can usually be done by employing the principles of regional anesthesia. Under Professor Labat's instruction, we have taken advantage of such anesthesia and we now employ it daily in cystoscopy of patients with intolerant bladders. Sacral anesthesia, or parasacral anesthesia will render the urinary tract insensitive to pain and can be employed not alone in cystoscopy but also in the treatment of stricture of the urethra, litholapaxy or any work on the perineum.

It is a well-known fact that the late mortality following nephrectomy for renal tuberculosis is highest during the first year. Dr. Cabot's explanation of this early post-operative mortality is of great interest. It certainly can hardly be ascribed to a direct result of the operation and the question naturally arises can it be due to disease in the other kidney? It has been my observation, however that the majority of patients who die within six months or a year following nephrectomy, and where the other kidney was found on clinical examination to be normal that they did not die of renal insufficiency. I am under the impression that with many of these patients death is due to other diseases such as general tuberculosis, meningitis, pulmonary tuberculosis, etc. However, we must always be careful to investigate for every evidence of disease in the other kidney.

In a series of cases observed some time ago, we made guinea pig inoculations with the urine from the other kidney and the results obtained were negative in every case. We showed conclusively that in a large series of patients with evident unilateral renal tuberculosis that the other kidney was not diseased. I am under the impression that even though a small amount of pus is found in the ureteral specimen of urine from the other kidney, it is advisable to go ahead and remove the diseased kidney. When one kidney is found to be badly diseased, even though there is a question of infection in the other kidney, nephrectomy of the former kidney is advisable, and might give temporary benefit at least. While it is possible that the other kidney may become infected by the trauma of careless or frequent catheterization, it is necessary that evidence of infection and an estimate of renal function of the remaining kidney be ascertained.

In regard to dilatation of the ureter on the other side, to which Dr. Cabot has called attention, it is probable that this is often explained by ascending ureteritis which will not involve the kidney. After the removal of the diseased kidney the cystitis will usually disappear and with it the urethritis on the well side. On subsequent cystoscopic examination the previously dilated ureter has in a number of cases been found to have become normal.

DR. E. S. JUDD, Rochester: This Association is indebted to Dr. Cabot for his broad and instructive paper on the management of renal tuberculosis. I was much impressed with the fact that he considered frequent and repeated examination in these cases not only unnecessary but often harmful.

It is interesting to note that he feels as we all do, that it is essential to have special instruction in the methods that must be employed in making these examinations. Special instruction and training is important because it helps to develop experience and judgment so that these repeated examinations may be dispensed with.

It seems that even the most experienced urologists have difficulty in making sure that the disease is unilateral. I feel that if there is a reasonable doubt

in certain of these cases, it is advisable to make an incision and explore the supposedly normal kidney before removing the diseased one. To be sure, a slight infection might be overlooked, but this would probably be of no consequence, while to remove the kidney which is bound to be infected and then find that it had the better function of the two, is a very serious error. I believe that an apparently normal kidney will often have a slight infection which is not demonstrable. If one kidney is extensively involved and the other slightly, in certain selected cases it may seem best to remove the one which is most extensively involved, if the process is active at the time. Not many patients with evidence of bilateral renal tuberculosis will get well by this procedure, and yet in some instances this has seemed to help.

I believe that in some cases that are diagnosed as acute renal tuberculosis, there is really a general biliary tuberculosis at the time, and that we do not become aware of the general nature of the disease until after the kidney has been removed. It is possible that the general infection is brought about by the operation on the kidney, but I do not believe that this is often the case. I have been impressed with the number of cases that presented renal tuberculosis in whom roentgenologist has noticed old healed or sometimes active tuberculosis of the lungs, although these same patients have no pulmonary symptoms. Thirty-eight per cent of our cases of renal tuberculosis in 1919 had definite chronic or healed pulmonary tuberculosis that we could demonstrate. This has raised the question with me whether all sorts of tuberculosis may not be primary in the lungs, although frequently more evident somewhere else.

The existence of other tuberculous lesions at the same time have made surgery for renal tuberculosis rather unsatisfactory. If the kidney removed contains the only focus of tuberculosis, the results are most gratifying.

DR. G. SCHMIDT, Lake City: In listening to this able discussion the question which has occurred to me is this: Suppose I was the patient and had one kidney out; what would I want done to myself? I thought of three things. First, to be fed properly to fit my body to take care of or overcome the trouble, second, I would remove all sources of toxemia which poison the blood. (I think the large intestine is the most overlooked source of this trouble); third, I would want the 2,000 candle power light and the Alpine sunlight used on myself. With these three things used I would expect to have a better chance to get well. There is nothing better that I know of that can be used.

DR. R. E. FARR, Minneapolis: I enjoyed the exposition of this subject by Dr. Cabot very much, and I rise simply to mention two points. First, I operated on a case a few years ago that had tubercle bacilli in one side and a lesion that we could feel by vaginal examination. We removed the kidney, examined it, and found that it was absolutely normal in every respect. The kidney was examined



thoroughly by Professors Robertson and Bell at the University, and they were not able to find tuberculosis or a healed process in that kidney, but, about two inches of the ureter at the bladder were infected with tuberculosis, which would be in a sense evidence that we do have an ascending infection at times.

Another point I thought of was brought out by the fact that I had operated on many patients years ago when I was doing cystoscopic work with the patient in the knee-chest position, and collecting urine through an obliquely cut cystoscope of the Kelly type, and not catheterizing the ureters. Three of those women have remained well for fourteen, fifteen and sixteen years respectively. Is it not possible that it would be well to collect urine in this way in women who are suspected of tuberculous kidneys? Caudal anesthesia is wellnigh ideal for cystoscopic work. Providing it proves safe it is sure to become the anesthesia of choice.

DR. CABOT (closing the discussion): Dr. Braasch did not understand me in regard to the group of cases I was discussing. I postulated that they did die of tuberculosis of the other kidney. There is another group which died of tuberculosis elsewhere following operation on the kidney just as they die following operation for tuberculosis elsewhere. I was leaving these out of account. I was dealing only with a group of cases which, supposed to have one sound kidney, following removal of one tuberculous kidney, died of tuberculosis of the remaining kidney within two years.

I do not know quite what to say in regard to the possibility of closed tuberculosis being discovered with certainty by guinea pig inoculation. I am quite satisfied that there is a group of cases of closed tuberculosis in which the tubercle bacilli do not enter the urine except in very small numbers. Of course, it has been known for a long time that patients with no tuberculosis of the urinary or genital tract, but with tuberculosis in other parts of the body, will more or less constantly excrete, if that is the proper word, tubercle bacilli. They will have tubercle bacilli in the normal urine, and I am not clear that the tubercle bacilli in closed tuberculosis appear in the urine in any greater number than may be found from tuberculosis elsewhere.

I am quite in accord with what Dr. Judd has said about exploration in cases of doubt in regard to the soundness of the other kidney. There is a goodly group of cases in which, with the best efforts you can make, you are still unable to satisfy yourself in regard to the condition of the other kidney. Some of the cases frankly in my hands are not catheterizable. I cannot find an opening on the other side of the bladder into which I can fit a catheter. This difficulty is bound to occur even in the hands of those of wide experience, and personally I have depended more upon the condition of the ureter than upon the condition of the kidney upon the doubtful side. I have seen so many cases of rather early tuberculosis of the kidney in which I was utterly

unable to discover any abnormality in the kidney by examining it with my fingers. On the other hand, in that same group of cases the ureter is grossly pathologic, and it has been my custom not to explore the opposite kidney, but to make a muscle splitting incision in the iliac fossa, slip the finger down and feel the ureter. If the ureter is sound, I will take a chance on it. It is a little hit or miss, but I think it exposes the patient to somewhat less operative trauma than exploration of the other kidney.

I remember well seeing this happen years ago before cystoscopy: One of the most skillful surgeons I ever saw cut down upon a kidney in the presence of frank tuberculosis with tumor, etc., on one side. He put in his hand, felt the other kidney, and said to his house physician, "That is a perfectly good kidney," and he took out the kidney which he had exposed and which contained all the secreting substance the patient had. What was left on the other side was a caseous kidney with normal outline. There was not a milligram of kidney substance left at the end of the operation. I am in doubt of my ability to be sure of the condition of a kidney thus examined particularly in the early stages.

In regard to the question of operation in bilateral tuberculosis of the kidney, that is an open question, but we ought not to be too pessimistic. It was apparently shown fairly satisfactory by a rather small group of cases some years ago with advanced tuberculosis on one side and a little tuberculosis on the other, that removal of the worst kidney helped the kidney which was left; that apparently the antibodies developing in the body helped out the other kidney.

Just the other day a most interesting article appeared by an Italian experimenter in which he showed that if you inject tubercle bacilli into the kidney of an animal and leave both kidneys in, there will be developed tuberculosis at the site of the injection. If you inject tubercle bacilli into a kidney, and take out the other kidney, tuberculosis will not develop. The work must be repeated, but it is interesting as tending to show that by throwing more work on the kidney and by increasing its blood supply, you help it to meet the attack of the tubercle bacilli. It may induce us to go back more to the view that we should operate in the presence of advanced tuberculosis on one side and early tuberculosis on the other. I am satisfied that is still in the debatable ground, and I certainly shall go over my cases and my evidence again to see whether I should reverse my recent decision not to operate in the presence of bilateral tuberculosis.

I am very much indebted to the gentleman who discussed the question of general treatment. There is no doubt whatever of its importance, and any of us bloodthirsty surgeons, who will take out a kidney and kiss the patient goodby without providing for future treatment of that patient, have not done our duty. It is perfectly clear that what he suggests is right. I would add one thing more which I think is of first class importance, and that is tuberculin. Since we

have made the use of tuberculin a routine and it is now nearly fifteen years, we have had very much fewer slow healing wounds, very much fewer sinuses, and I think a higher percentage of cures. Of course, that is mere guesswork because our technic has improved; many things have contributed to give us better results, but I am sure we have less sinuses, cleaner healing wounds, and fewer wounds which break down weeks and months afterwards or that come back to bother us with our own inefficiency. General treatment after operation must be put in advance of everything else.

### DENUDATION OF INOPERABLE CANCER, AN AID FOR EFFICIENT RADIO- THERAPY\*

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There is a class of cases of recurrent carcinoma in which the surgeon has practically abandoned all hope and efforts. It is difficult enough to eradicate a primary growth but when recurrence has taken place surgical intervention is usually regarded as futile. It is to this class of apparently hopeless cases I desire to call attention, and to make suggestions as to what can be done for them. If we can save only one in one hundred we shall have accomplished something.

As a rule, the surgeon will refer such a case to the roentgenologist for x-ray and radium treatment, not because he expects a cure, but, because he does not wish to deprive the patient of the hope that something more can be done for him; and also because he is aware that radiotherapy is beginning to accomplish results, which in former years were thought impossible.

In the past four years I have selected for investigation a series of about 50 cases and have come to the conclusion that we are entirely too pessimistic and that a percentage of these cases may be benefited and possibly cured.

It is well known that superficial malignant growths such as epitheliomata may be benefited by radium or x-ray treatment.

Reports from reliable sources of such cases prove the efficacy of this treatment. Deep seated carcinomata however do not yield in the same degree to deep therapy. What is

the cause of this? We must seek the explanation in the physics of radiotherapy.

Radium as well as the x-ray produces rays of various wave lengths and penetrating power. In the case of the x-ray, the wave lengths depend upon the vacuum of the tube. The hard rays are more penetrating. Radium emanates three varieties of rays, the alpha, the beta, and the gamma rays. The alpha rays constitute about 91 per cent of these rays, the beta about 7 per cent, and the gamma only 2 per cent. The alpha rays cannot be considered in their action in radiotherapy since they are absorbed in the glass receptacle in which the radium is suspended. Rutherford states that 6/1000 inch of aluminum or a sheet of thin writing paper will absorb all the alpha rays. The beta rays are more penetrating and nearly all will be absorbed by 5 m.m. of aluminum or one m.m. of lead. These rays are useful in radiotherapy, and their action may be controlled by proper screening. The gamma rays are very penetrating and these are the rays that play the most important part in radiotherapy. The knowledge of the penetrating power of each variety of these rays is a practical guide in the proper application of radium and the x-ray.

For a rough working rule we may say that the thickness of matter required to absorb a certain type of rays, is inversely proportional to its density. It requires for instance 20 m. m. of aluminum to absorb as many rays as 1 m. m. of brass. The density of tissues also vary in the absorptive power of rays. Skin will filter more rays than fat, and bone more rays than skin. Shadows on the photographic plate of different substances of equal thickness give us an approximate index as to their density. The density of any substance depends upon close packing of molecules of which it is composed. Metals such as gold have a greater density than wood, or flesh, because the gold molecules are packed closer.

We have already stated that the alpha rays are not to be considered in the treatment of cancer. The beta rays are about 100 times as penetrating as the alpha, and the gamma rays are again from 10 to 100 times as penetrating as the beta rays. Are we at present utilizing these rays to their full extent? I will state unhesitatingly that we are not. We are wasting the greater part of the radioactivity of these rays,

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at least when we apply radium to a deep seated growth.

But it is not the only factor playing a part in their action. Two other factors must be considered: first—the depth of the pathological tissue; second—the vulnerability of the pathological tissues as compared to the normal tissues.

The skin, fat and muscles which cover the deep seated growth, are barriers to the penetration of the rays. They act as filters in addition to the strong artificial filters of lead and aluminum which the operator usually employs, in order to prevent burns of the skin. There is another factor which diminishes the action of the radium. In applying a radium capsule of 50 mgr. on the surface of a wooden block one inch square, we obtain only the rays which penetrate downward toward the block, and lose all the rays which emanate upwards and sideways (Fig. 1). If the same capsule of 50 mgr. were inserted into the tumor itself, the radium rays would pene-

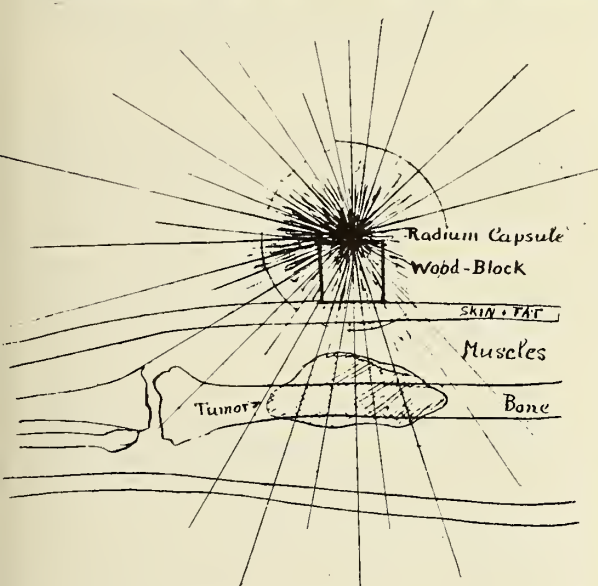


Fig. 1. Action of Radium diminishing with distance and filter.

trate the tissues from every surface of the capsule and effect the growth in all directions.

I have come to the conviction that deep seated cancers do not yield to treatment of the radium because the skin, fat and muscles are distinct barriers to the action of the most effective radium rays—namely some of the beta and a large portion of the gamma rays.

I have, with the cooperation of Mr. G. W. Warner, a physicist to the Ryerson Laboratory in the University of Chicago, published some experimental work, which proved that human skin, fat and muscles absorb large quantities of the x-ray. This fact suggested the idea that if

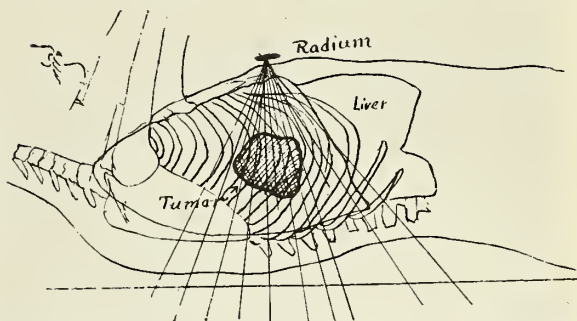


Fig. 2. Illustration of proportionate radium rays reaching the tumor when deep seated.

skin, muscle and fat and as much cancer tissue as possible, could be removed so as to leave only remnants of the growth, the radium or x-ray could be applied directly into the cancer bed with no obstruction to the activity of the rays; in other words, we could transform the deep seated growth into a superficial one. To illustrate this principle, we shall make a schematic drawing which represents a cross section of the body, in the center of which is located a malignant tumor. (Fig. 2.)

Let us suppose that the tumor in this case is about six inches from the surface of the skin. In order that the rays may reach the tumor, they must penetrate and pass through the overlying tissues. These tissues will absorb all the beta, and a portion of the gamma rays. The gamma rays, being very penetrating, will reach the tumor; but that does not mean that all of them will be arrested in the tumor mass. A certain quantity will be arrested in the growth itself and the balance will pass through the tissues beyond the tumor. When a ray is arrested in the cell, it will probably have a more deleterious effect upon the life of the cell. If it passes through the cell, it will no doubt injure it also; but not in the same degree as it would if it were actually arrested in it. We cannot ignore the fact that the tissues above and beyond the tumor must suffer also.

When treating deep seated carcinoma through overlying tissues, we are obliged to use larer



Fig. 3. Carcinoma of the breast involving the axilla.



Fig. 4. Amputation of the breast and cleaning of the axilla, for open wound treatment.

doses and more penetrating rays in order to deliver into the tumor the required dosage of rays for its destruction. If, for instance, three inches of fat and muscle intervene between the skin and tumor, it will require three or four times the quantity of the radium properly screened to obtain the dosage such as it would, if the tumor were on the surface. By reducing the dosage, the action of the penetrating rays upon the structures beyond the tumor, will be cut considerably, sparing the normal tissues above and below the growth, consequently preventing a toxemia.

It is thus evident that the application of radium, to be of any value in the treatment of these deep seated or advanced cases of carcinoma must be thoroughly understood. Sufficient knowledge of the physics of radioactive substances as well as the x-ray are essential. This does not mean that an expert physicist will obtain the best results. It requires also a complete knowledge of the pathology and principles of surgery. Those who are familiar with all these three branches: surgery, pathology, and physics have a greater advantage and thus are apt to carry out the treatment more efficiently.

Having thus outlined the principles of application of radium and the shortcomings of its action without surgery, and having suggested a method by which the radium can be applied more directly to the diseased tissues, I shall quote, for illustration, a few of the cases which have been tested with this form of treatment during the past few years.

*Case 1. Carcinoma of the Breast.* The patient is 54 years old and has a tumor of the breast with retracted nipple, with involvement of the axilla and the supraclavicular space. A typical case of advanced carcinoma of the breast. (Fig. 3).

The operation was performed on Sept. 19, 1920, consisting in a complete resection of the breast and the removal of all the intra-axillary glands in the usual way, except as to the skin closure. (Fig. 4). The wound edges were temporarily approximated by inserting four temporary sutures in order to cover up the region of the vessels in the axilla (Fig. 5). The four sutures were removed 24 hours later and the skin was allowed to retract.

This left a large gapping wound open for radium and x-ray treatment, which was applied subsequently as follows:

9/28/20—1200 mgr. hrs. over dressings screened by lead, rubber and cork.

10/16/20—1200 mgr. hrs. over dressings—screened as before.





Fig. 5. Temporary approximate of skin sutures removed 24 hrs. later.

Fig. 6. Pt. five months after the operation with no recurrence.

10/23/20—1100 mgr. hrs. over dressings—screened as before.

11/6/20—900 mgr. hrs. over dressings—screened as before, with the addition of gauze.

This was supplemented by x-ray treatments obtained in standard doses, every third day, for three months.

The skin gradually grew together over the denuded surfaces with the assistance of adhesive strips along the margin of the granulating area until the entire wound was covered.

The patient is now in good health but it is too early to speak of a cure. The case is here represented only to illustrate the technique in the treatment of this kind of case. (Fig. 6.)

Fifteen such cases of recurrent carcinoma of the breast have been treated upon these principles. We feel that it is too early to speak of end results, but what we have gained by our experience will be of great value to us in the future.

Three cases of the fifteen died of radium toxemia. One case died from an erosion of the axillary artery due to an ulcer produced by close proximity of the radium needle on the axillary artery. (Haemorrhage.)

One of the cases died from acute pulmonary tuberculosis after having been free from recurrence for one and one-half years. One case in

which I amputated the entire shoulder girdle, died from perforation of the pleura in the apex region produced by forceps during the dressing. Death followed in a few hours after the accident. The remainder of the cases are still alive but sufficient time has not elapsed to pronounce them cured.

*Case 2. Epithelioma of Lower Lip with Involvement of the Glands of the Neck.* Patient is 53—presents a large ulcerated growth involving the entire lower lip including the angles of the mouth. He is unable to retain the saliva and has difficulty in eating. The right submaxillary gland is the size of a hen's egg. Patient lost considerable in weight and strength.

*Past History:* The ulcer first appeared a year ago, in the region of the mucocutaneous border, and gradually grew to the present size. (Fig. 7). It was first diagnosed as syphilis, although the Wassermann was negative. An extensive anti-syphilitic treatment produced no results.

*Examination:* The growth involves the entire thickness of the lip clear to the gingival margin, and there is no mucous membrane left. The right cheek is involved, a hard nodule 5 inches from the angle of the mouth being present. The left cheek and neck are free. No metastases found in the body.

*Treatment:* Operation Aug. 13, 1920. Excision of the entire lower lip and both angles of the mouth, and that part of the right cheek containing the nodule



Fig. 7. Epithelioma of the lower lip involving the glands of the neck.



Fig. 8. Introduction of radium into the open wound and beneath the skin.



Fig. 9. Section of upper lip prepared for later plastic.

with a good margin of normal tissue. The incision was then carried to the neck and exposed the region of the gland involvement. The entire area was thoroughly exposed and all glands removed. A suture was made from the angle of the lip to within one inch of the lowest point of neck incision. (Fig. 8). Rubber drain was introduced to leave the channel for radium introduction. No attempt was made to reconstruct the lower lip, at this time. It will be noted that we left the entire surface exposed to facilitate application of radium and bring direct action on same in cancer bed.

Radium treatment was begun a week after operation. A tube of 50 milligrams was inserted for 4 hours into the lower lip wound and 25 milligrams into the channel left in lower border of the wound in the neck. Application of same dosage was repeated

3 times at intervals of 2 weeks. A total of 1400 mgr. hours. The region of the neck was treated weekly with x-ray exposures of 4 minutes and spark gap of 8 inches at intervals of three days.

In Fig. 9 we note the provision which was made for later plastic. A section on each side from the upper lip each about one-half inch long was prepared to cover the defect in the lower. No suturing was done, the two nipple like portions being allowed to drop down towards the raw surface of the lower lip.

In Fig. 10 we demonstrate the application of radium in the recess of the gingiva.

In Fig. 11 a complete healing has taken place. The border of the mucous membrane from the gingiva has joined the border of the skin of the wound edges of the chin. The patient is able to open his mouth widely.

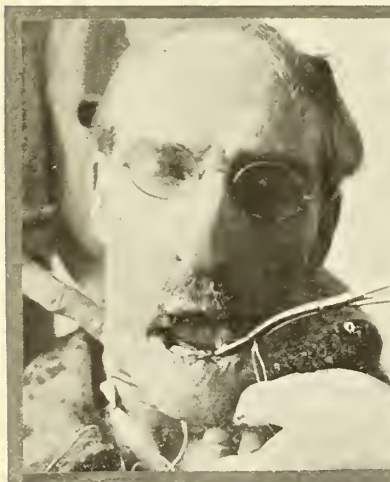


Fig. 10. Cross fire application of radium.



Fig. 11. Complete healing three months after operation, without a plastic operation.



Fig. 12. Illustrating the patency of the mouth.





Fig. 13. Malignant ovarian cyst.

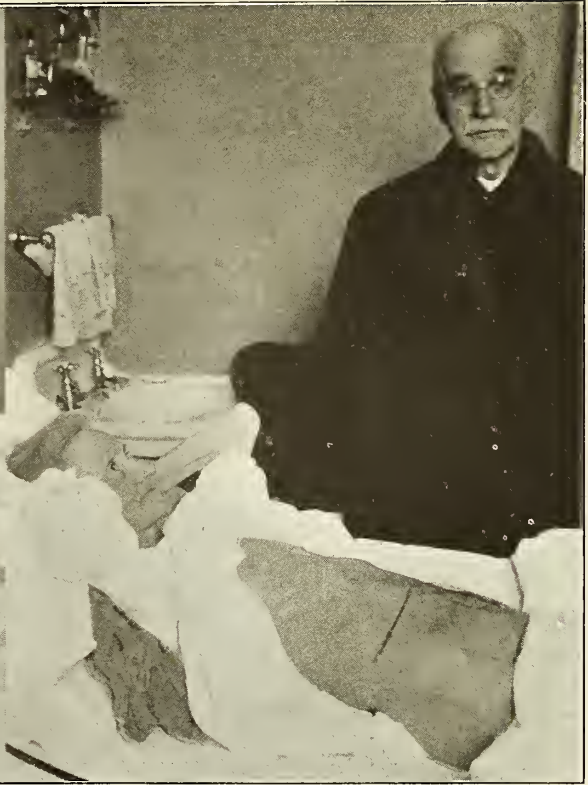


Fig. 14. Application of radium through funnel shaped crater into the interior of the cyst cavity subsequent to operation.

In Fig. 12 we show that patient is able to close his mouth patently, he retains his saliva—no difficulty in eating, and up to date there has been no signs of a recurrence.

*Case 3. Malignant Ovarian Cyst (Cyst-adenoma) Treated by Open Method.* Mrs. E. S. 66 years old entered the hospital March 10, 1919. Since Dec. 1918, she noticed that her abdomen had grown to a very large size. She lost control of her bladder and lost considerably in weight. Her legs were swollen up to her knees. The diagnosis had already been made by her physician as a malignant ovarian cyst.

An exploration was made, the diagnosis was confirmed and the case was considered inoperable. There was some fluid in the abdomen and intestines, and the enormous tumor was matted with intestines and studded with small growths resembling papillomata.

The abdomen was closed. She received x-ray treatment for six months, which did not benefit her. The abdomen grew larger and larger until she could hardly breathe. (Fig. 13).

In her desperation she insisted upon an operation and the same was performed November 15, 1919. Median incision from the ensiform cartilage to the pubes to deliver the tumor out of the abdomen. The loops of the intestines were firmly adherent to the base of the tumor. The tumor itself was firmly attached in the entire pelvis and thus was not removable in its entirety. The cyst was, therefore, opened and its

contents, a gelatinous mass, removed (above five quarts in quantity).

The upper two-thirds of the tumor was then amputated. The wall of the tumor being 2 to 3 inches thick in certain portions and again thinner in other parts. The edges of the skin were then sutured to the rim of the amputated cysts and the cavity packed with gauze so that there was a funnel shaped cavity reaching the lowest part of the pelvis.

The interior of the cyst was then treated by direct application of radium at intervals of three weeks—700 to 1000 mgr. hours being given each time. The radium treatments were supplemented with deep therapy, one erythema dose given every second day.

The cavity gradually diminished in size by contraction of its walls and absorption of the tumor, and the patient gained in general health and strength.

The abdominal opening into the cyst remained open for 16 weeks in a suppurating condition, but finally closed, remaining so up to date—nearly a year and a half after operation. The patient is now attending to her daily housework, and has been able to take care of a very sick husband for nearly four months.

Fig. 14. Shows introduction of radium into the cavity by curved applicator.

#### COMMENTS

(A) By eversion of the interior of a malig-

nant cyst, we transformed an intra-abdominal, into an external abdominal tumor, and thus are able to apply x-ray and radium directly into the seat of malignancy.

(B) It is safer to treat the tumor in this manner compared to the attempt of complete enucleation.

(C) It is preferable to treat with radium combined with x-ray than either alone.

*Case 4. Sarcoma of the Right Lung. Removal of Interior of Tumor—Subsequent Radium Therapy within the Cavity.* Previous history: Patient was seen in June 1919. She was referred to me from the Nurses department on account of slight expectora-

again on account of the same symptoms of blood spitting followed by some clots, cough and sputum. The cough had persisted for about three months prior to this, but the weight remained the same. She had had a slight temperature for the past three weeks. Physical examination showed more decided dullness over the right hilus in the back. The x-ray showed that this original shadow was about three times as large. It was round and suggested the textbook description of a hydatid cyst. Thinking that it might be a hydatid cyst, we made careful blood examination. No eosinophilia was ever found. We secured some Weinberg's antigen from New York and a complement fixation with this antigen was negative. Wassermann and complement fixation for tuberculosis were negative.



Fig. 15. Tumor in right lung before operation. (Sarcoma.)

Fig. 16. First step of operation. Exposure of pleura.

Fig. 17. Second operation. Tumor mass excenteration.

tion of blood followed by a slight amount of sputum. She was 23 years of age, unmarried, and her best weight was 126, present weight 124. Three examinations of sputum revealed no tubercle bacilli. Wassermann negative; complement fixation for tuberculosis negative. Afternoon temperature 99.1. Physical examination showed a few moist rales over the right hilus in front and back with no change in the percussion note. There was some slight enlargement of the thyroid. The x-ray stereos showed a well defined, clean-cut hilus shadow in the center of which was another round shaped shadow about the size of a twenty-five cent piece. It was so round in shape and abrupt in its outer margin as to attract attention. It was not typical of tuberculosis or of anything which involved the lung tissue proper. In three weeks the temperature and sputum had disappeared, and the patient resumed her work as a nurse.

On April 7, 1920, the patient was referred to me

In July, 1920, the patient was again referred to us. Physical examination at this time showed feeble breath sounds between the second and fifth ribs with a few fine crepitations. In the back there were also very feeble breath sounds from the third to the seventh rib close to the spine. The tumescence in the lung was about the size of a naval orange. The sputum was negative for tubercle bacilli and for echinococcus hooklets. Neither could pus cells or elastic tissue be demonstrated.

On Sept. 10th, the patient had another attack like the one in April; that is, cough and some hemoptysis followed by bloody sputum for several days and an elevation in temperature. This cleared up in about 3 weeks. During this time the pupils were dilated. The physical signs were more definite over the right lung, and the x-ray showed that the tumescence had increased and was as big as a grapefruit. Present weight 118. At the present writing, the patient has



returned from another such an attack with a decided increase in physical findings, and also in the x-ray which we have indicated in our report.

*Examination of the Chest*—Right lung: Dullness as low as the sixth rib. Fine rales in the first and second interspaces. The breath sounds, however, are not decidedly interfered with. In the back the breath sounds are weak and inspiration is rough as low as the eighth rib with some crepitations at the base. Left lung: No abnormalities except a few fine rales over the hilus in the back close to the spine.

*Interpretation of Stereo Chest Plates*.—Right lung: There is an enlarged, massive shadow filling most of the lung except the apex and extreme base. This is round in character and reaches the pleura from the third to the seventh rib in mid-axillary line. The

ing slightly in weight; otherwise she was apparently normal.

Stereoroentgenograms revealed a tumor which occupied two-thirds of the right chest cavity; oval in shape and lying transversely within the diameter reaching from the heart to the ribs. (Fig. 15).

A puncture was made with the long trocar and about 10 c. c. of a fluid (almost normal blood), was withdrawn. This did not ascertain the diagnosis and operation was decided upon, and carried out in two stages, as follows:

*Primary Operation* (under general anesthesia) Oct. 15, 1920. A skinflap including muscles and fat 7 inches in diameter, was raised (Fig. 16). Six inches of each of the fifth, sixth and seventh ribs were resected exposing the pleura over the tumor mass. The

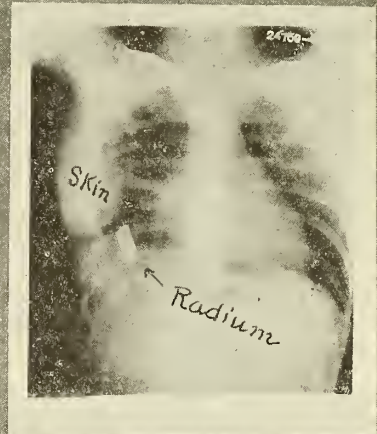


Fig. 18. Showing the depth of the cavity, after removal of tumor.

Fig. 19. Inspection of cavity, showing bronchial opening.

Fig. 20. Skiagram four weeks after the operation.

lung itself seems to be clear. The trachea does not seem to be definitely displaced. Left lung: Clear.

Lateral stereos made from the right to the left with the arm above the shoulder show the lesion adhered to the posterior thoracic wall, and it does not come within six or eight centimeters of the sternum and anterior thoracic wall, the closest point being the area between the third and fifth ribs. In the back, however, it seems adhered as low as the upper part of the eighth rib; in other words, between the fourth and eighth ribs in the back we think the tumescence is touching the pleura.

The third stereos taken left posterior to right anterior shows the upper border of the lesion corresponds with the fifth rib in the back and can be seen as low as the sixth rib in the anterior axillary line.

*History:* Patient came to me on Sept. 28th, complaining of shortness of breath; coughing mornings; expectorating small quantities of rusty sputum; los-

skinflap was roled up and fastened with sutures, thus leaving the entire square (about 7 inches in diameter) exposed. The exposed pleura was then cauterized with silver nitrate stick in order to produce adhesions between the tumor and the pleura. The open wound was dressed with vaseline gauze.

*Second Operation* (under gas and ether) Oct. 18, 1920. The wound was exposed and a purse string suture placed in the center of it to insure quick closure in case there should be uncontrollable hemorrhage. The tumor wall was then incised; the capsule was rather firm but the interior of the tumor was composed of a semi-solid brain like tissue, perhaps somewhat more solid but not homogeneous. More solid portions than softer portions. It was possible to evacuate the contents in similar manner of delivering an adherent placenta. (Fig. 17). The mass was not entirely removed although it would have been possible at the risk of more severe hemorrhage, as

we could introduce the entire hand and wrist into the cavity and reach all portions; but we were satisfied to have opened the cavity and eliminated the greater part of the mass without breaking the capsule. The cavity was quickly packed with 12 face gauze sponges. Patient left the operating room in good condition.

*After Treatment:* Forty-eight hours after the operation the 12 soft gauze sponges were removed under anesthesia. There was no hemorrhage; but we removed another four or five ounces of the tumor mass from certain recesses of the enveloping capsule. The cavity was repacked. (Fig. 18). One week after the operation 50 mgr. of radium was introduced into the cavity in the center of a rubber ball, giving some 375 mgr. hours. The wound was dressed daily (Fig. 19) and the following dosage of radium was introduced on the following dates:

Oct. 28, 1920, 600 mgr. hrs.; Nov. 8, 1920, 425 mgr. hrs.; Nov. 18, 1920, 450 mgr. hrs.; Dec. 6, 1920, 400 mgr. hrs.; Dec. 3, 1920, 400 mgr. hrs.; Dec. 22, 1920, 300 mgr. hrs.; Jan. 14, 1921, 450 mgr. hrs.; Feb. 2, 1921, 400 mgr. hrs.

Stereoroentgenogram taken four weeks after the operation shows only a small remnant of the tumor mass, and the tumor wall is very thin. (Fig. 20). Patient is able to walk and is rapidly gaining in weight and strength.

Patient is now back at her former residence and although she has not resumed her former duties as a nurse she is still gaining in weight and strength.

#### COMMENTS

The cases that are here cited were selected for the purpose of illustration of the principles of the technique in the progress, and not for statistics. A statistical report with more definite conclusions will be postponed and be given in about two years. At this time we can only state that we are not discouraged. In every case there was an actual gain because with the exception of three, everyone submitted to the treatment was considered hopeless from the start.

Our mortality naturally was very high on account of the extensive operations which had to be undertaken, and also on account of the mishaps which might be avoided in the future. Four of our cases died from acute hemorrhage due to ulceration of the large bloodvessels; one from the femoral, one from the axillary, and two from the carotid. Four cases died from the roentgen ray toxemia.

On the other hand we have a number of cases which have stood a reasonable test of time. A case of carcinoma of the breast is still alive without recurrence two years after the operation. One case of carcinoma of the submaxillary gland in which three radical operations preceded

the last (which was the open method), has no recurrence for two and one-half years and is in perfect health, and others which, according to past experience and general rules, should have terminated fatally before this, are still alive and without recurrence; but not sufficiently long to count them as cures. At any rate we are satisfied that we have done harm to none and benefited a few.

#### DISCUSSION

DR. H. H. BOWING, Rochester: I am greatly interested in this report and clinic Dr. Beck has given us. I regret that time did not permit a more complete exposition.

I am not qualified to discuss this paper, for Dr. Beck is doing a pioneer work, a distinctive type of surgical procedure in combating advanced malignancy and time will tell whether or not he will continue to subject his patients to such heroic surgery.

It may be indicated in some cases. I am convinced that wide excision in combating borderline or advanced carcinoma of the cervix uteri is contraindicated; it does not facilitate irradiation.

The patients as a group are best treated with intensive irradiation, that is, radium or radium and x-ray, and in an occasional case surgery is indicated to make irradiation more effective.

It is my privilege to treat many similar cases, although I do not recall a case of primary sarcoma of the mediastinum. Sarcoma of the abdominal lymphatics with the primary in a testicle does not respond to radium and x-ray, the initial result following intensive irradiation is glittering.

Inoperable carcinoma of the thyroid yields very readily to intensive irradiation. 1000 milligram hours of radium is delivered to each square inch of skin surface overlying the tumor. 50 milligrams in a tube applicator are used, screened with one-half a millimeter of silver and two millimeters of lead at one inch distance. Time: 20 hours for each square inch. The treatment may be repeated in 30 days.

Carcinoma of the breast, either primary or recurring following radical amputation, respond to radium and x-ray therapy. The radium is screened and timed as mentioned in the cases of carcinoma of the thyroid. Each involved square inch of skin surface is treated. Shadowgraphs of the chest are taken to locate possible deep lymphatic involvement. All possible metastatic areas are exposed to intensive x-ray treatment. In advanced cases improvement is noted in most all, as a rule local sloughing is prevented and the deep metastasis are favorably influenced.

I recall one case of inoperable carcinoma of the ovaries in a young adult. An exploratory operation was done; a great portion of the tumor was removed and drainage tubes put in place and the abdomen closed. Fifty milligrams of radium in a round tube applicator was placed in each drainage tube, filtered with one-half a millimeter of silver, and allowed to



remain in place for ten hours. Radium was placed into the vagina screened with .5 millimeters of silver, one millimeter of brass, one centimeter of gauze, and a finger cot. This package was placed in the right and left vaginal fornix and left in each place for 14 hours. Two or three applications were made and deep x-ray therapy was given over the lower abdomen and back.

Three months following this application, the patient returned for observation. At this time remaining tumors were rapidly diminishing in size. Nine months following the irradiation, no demonstrable pathology could be palpated.

Retropertitoneal sacroma has responded well to combined radium and x-ray therapy. One case in mind of a man aged 23 years in which a right castration was done nine months previous and a diagnosis of sarcoma was made. When the patient presented himself for examination, the whole abdomen with the exception of the lower right quadrant was filled with a huge mass. Radium was given to the anterior abdominal wall and deep x-ray therapy was applied to the posterior and lateral walls.

1000 milligram hours of radium was delivered to each square inch of skin surface over the involved anterior abdomen, screened and applied as mentioned in cases with carcinoma of the thyroid. The boy reported six months after the first application and no demonstrable pathology could be palpated.

It has not been my privilege to treat primary sarcoma in the thoracic cavity. The primary foci and position of the sacroma controls the response to radium and the ultimate prognosis. Time will not permit further citation.

It is absolutely essential that the radium be properly applied and maintained in order to give the desired results. Patients with a malignant condition in such an advanced age as reported today will submit to most any type of procedure, although I am of the opinion that we must be conservative since we have effective therapeutic agents, radium and x-ray.

I appreciate listening to Dr. Beck's paper and I sincerely hope he will keep us posted as to the ultimate outcome of his cases.

DR. A. S. FLEMING, Minneapolis: Dr. Beck's paper seems to me to demonstrate conclusively the wonderful adjunct the surgeon has in radium in making his fight against malignancy. The surprisingly excellent results obtained in what appear to be absolutely irreparable cases are leading radiologists and surgeons to apply radium more and more frequently, and as the technique of its application is becoming more thoroughly worked out and uniform radiation of the malignant tissue being secured, the fight against malignancy is apparently gaining ground.

There is only one point that I want to emphasize in connection with this paper, and I think all of you will agree with me, and that is, the profession needs to entertain a more optimistic attitude with reference to malignancy. The laity only reflect the opinion of

the profession. The profession is very pessimistic. We are inclined to blame the laity for being pessimistic, but it is in no sense their shortcomings, but it is the attitude of the shortcomings of our profession.

The thoroughness of surgical measures adopted here, facilitating the more thorough radiation, is in a measure responsible for the results secured. The embedding of radium in the tissues is aiding a great deal to our securing more favorable results. The question of the physical and chemical problems involved in the application of radium is too complicated to enter into at this time. It seems to me, the more we are making available the beta rays, and the less dependence we place upon the gamma rays, the greater our success in its application will be.

DR. BECK (closing the discussion): I have very little to add to what has been said by those who have discussed my paper, but a few additional words might interest you. I have some views in regard to the question of why the cancer cell will succumb to the x-ray quicker than a normal cell, and if you will bear with me for two or three minutes I will be glad to give you those views.

A mass of cancer cells may be likened to an alienated detached and lawless community, the members of which have no function than reproduction and self nutriment. They know how to appropriate for themselves plenty of nourishment at the expense of the whole body. These cells grow without any definite arrangement of structure or function, in a lawless manner, and do not give any counter service to the organism in return for the nutriment they receive.

The growth is not under the control of the central nervous system. This community of cancer cells may justly be likened to some insurgent group of revolting men whom we often find in peaceful communities, who do not wish to perform any labor and ask for everything that labor produces. They too are also able to appropriate plenty of nutriment for themselves in a lawless manner—a sort of a Bolshevik community.

Is it not likely that these recalcitrant cells (cancer cells) which render no service to the whole, are denied the same protection against all sorts of injuries, which the normal working cell of the body receives? The normal cell belongs to the organism, and is under the control and protection of the cell community. It may be that some enzyme or lack of some substances of the normal cell, or some faulty arrangement of the chromosome weakens the resistance of the cancer cell.

Cancer has no nervous system. The skin, with all its sensitive nerve fibres, protects us from burns. That is not the case in cancer. A finer definition might be given, but I am of the opinion that the cancer cell is an outlaw cell which has no protection from the general organism.

In regard to the cases I have shown, I have more cases that are alive after three and a half years. One patient who had three radical operations on the neck

is still alive and well. Other cases are alive one or two years after treatment, but it is still too early to predict what the ultimate results will be. A large number of cases have been operated on too recently to make any predictions.

# A REPORT ON FIFTY CONSECUTIVE CATARACT OPERATIONS BY THE SMITH-INDIAN-FISHER METHOD\*

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The word cataract is an ancient one. The names and synonyms of many of the varieties of cataract appeared at an early date in Greek, Arabic and in Latin, after which they were either adopted in their original form by British authors or were translated, more or less literally, into English. A percentage of these early terms were based upon, or derived from, erroneous theories of the origin and other relations of true cataract. In fact, until the beginning of the eighteenth century all opacities (apparent or real) of the optic media were included under the term "cataract."

Beard gives a most useful, modern and scientific classification, as to age, cause, etc., as follows:

1. According to the age at which it appears: congenital, juvenile, adult, senile.

2. According to the cause: spontaneous, traumatic, symptomatic, albuminurie, arterio-sclerotic, chemic, thermic, heat, cold, electric, diabetic, glaucomatous, malarial, phosphaturic, nphthalmic, spasmodic, ergotinic, ciliary cramp, tetanic, thyroidismic, uveitic.

3. According to consistency: liquid, soft, semi-hard, hard, ossific, calcific.

4. According to color: white, gray, greenish, amber, black, blue.

5. According to extent: total, partial, nuclear, perinuclear, cortical, capsular.

6. According to the seat and disposition of the opacities: central, nuclear, perinuclear, anterior, cortical, posterior cortical, anterior polar, equatorial, disseminated, punctate, zonular.

7. According to the presence or absence of complications: simple, complicated.

8. According to the period of development: incipient or commencing, immature, mature, hyper-mature or regressive.

Cataracts are generally considered to be a senile degeneration. Almost all pathologic changes that effect the nutrition of the eyeball may produce it. In that sense it is generally a secondary disease, and we know that nephritic alterations, diabetes, exposure to great heat, various poisons, arterio-sclerosis, ergotism, auto-intoxication, eye-strain, injury to the lens or surrounding parts, heredity, etc., are regarded as exciting causes of it.

There are no constant symptoms of cataract in general, especially in the early stages. Sight will not be much affected until the nucleus is involved. The patient then complains that images are distorted or multiplied or that there is a cloud, or floating body, before the eyes.

The fogginess increases very slowly until finally the visual acuity is reduced to the counting of fingers. In the early stages, before the opacity has completely invaded the periphery, vision is better in a dim light, because that moderate dilation of the pupil that occurs in a partially illuminated room, for example, permits the patient to see through some, as yet unaffected, peripheral parts of his lens.

Herbert whose immense experience gives him a right to speak upon this subject, believes that it is most convenient from the clinical standpoint to divide the stages of development of cataract into: (1) incipient, (2) unripe, (3) ripe, or mature, and (4) over-ripe. It may be roughly stated that in the incipient stage they often require a dilated pupil or dark room examination for their certain detection. Unripe cataracts are at once recognizable with the naked eye, but there is still some transparent or semi-transparent cortical matter remaining. In the ripe stage the whole lens is opaque. Over-ripeness is shown by certain secondary changes, and by the formation of capsular opacities, recognizable by being whiter than any superficial opacity of lens substance. The term "ripeness", indicating complete opacity of the lens, implies also that the whole lens can be removed from the capsule easily, "like a ripe fruit out of its shell". The term is still retained to denote the fullness of

\*Read before the Minnesota State Medical Meeting, St. Paul, October, 1920.



the cataractous change, though it has long been recognized that lenses are fit for removal while still preserving much of their transparency.

The cataract was unrecognized as a disease of the lens until 1650 A. D. Previous to that time it was supposed to be an effusion between the lens and the cornea.

The non-operative treatment of cataract has occupied the attention of ophthalmologists from the earliest times, both before and since its pathology was understood and a precise knowledge of the difference existing in its varieties has been acquired. In some cases of genuine cataract, the opacity has disappeared without treatment, and there can be no doubt but that diabetic striae not uncommonly disappear or the occasional cloudiness of the lens due to exudates between the fibrillae may undergo absorption; but apart from these considerations the application of drugs produces little or no effect.

Jacques Daviel in 1748 first published a description of the modern operation for senile cataract. The cut was made with the flap down, by the use of a keratome and then enlarged by the scissors. The capsule was incised with a needle. Later the German operators made the flap up, which is our present method.

The extraction with an iridectomy was introduced by Von Graefe in 1866. The extraction in the capsule was suggested by Beer, but was performed and the technique explained by Lieut. Col. Henry Smith of India.

We visited some of the Indian operators in this country and finally decided on the Fisher method as being the safest: first, because of his lid hooks which give complete control of the lids and prevents the patient from squeezing the eye, and second, because of his needle, which is the safety valve of the whole operation.

With this method it is not necessary to wait for the cataract to get "ripe". Whenever the patient is unable to see well enough to get around, the cataract is ready for operation.

The success of the operation and the after results depends on several factors: first, the preparation of the patient; second, the patient on the operating table; third, the operator and his assistant; fourth, the complications during the operation; fifth, the behavior of the patient after the operation; sixth, the after inflamma-

tion; seventh, the clearness of the pupil; eighth, the condition of the vitreous and fundus.

Under the first, we consider the general physical condition of the patient; the blood pressure, urine, tension of the eye, the condition of the conjunctiva as to bacteria, the lacrymal sac, and, what is probably the most important, the teeth, nose and tonsils.

Second, we always give our patients a hypodermic of No. 1 H. M. C. before coming to the operating table. This gives you a quiet patient at the time of the operation and eliminates many troubles.

Third, the operator must be fairly skillful and have a knowledge of what to do when complications arise; and he must have a good assistant.

Fourth, under complications during the operation, we mean loss of vitreous, ruptured capsule and spontaneous hemorrhage, as these have a bearing on the amount of vision the patient gets.

Fifth, some patients behave badly after the operation, opening and closing the eye endeavoring to see. Occasionally a patient vomits and occasionally one goes insane, but the most damage comes from the one who keeps poking at the bandages and in doing so, strikes the eye, opens the wound and gets a prolapsed vitreous or iris. Another class starts doing heavy work too soon after the operation.

Sixth, we have found that when a piece of capsule or cortex was left behind or if all focal infections were not removed before the operation, when the bandage was removed, we invariably found a red eye. So far, we have had no infections but this will happen occasionally to the best operators.

Seventh, if the cornea is clear and no capsule left, other things being equal we will have good vision. If the capsule is left, the vision is reduced in spite of needling operations.

Eighth, cataract eyes are, in many cases, diseased. While you are unable to tell beforehand, you are often disappointed to find after a successful operation that the patient has changes in his vitreous or fundus, and in some cases after a perfect operation, a clear pupil, and so far as you can discern, a normal vitreous and fundus. still this patient cannot see well.

Briefly, the technique of this operation is as follows. A hypodermic of H. M. C. is given after the cocaine anesthesia, the conjunctiva sac is

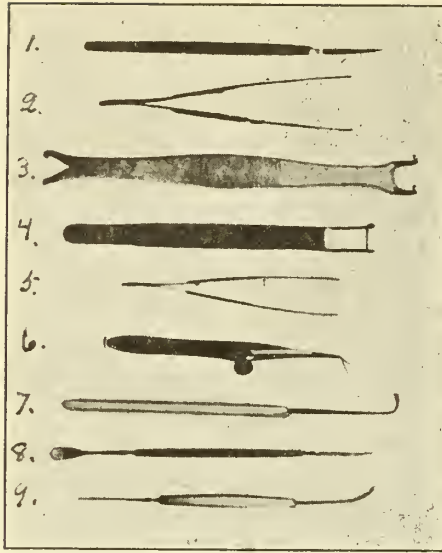


Fig. 1.

flushed with 1-5000 bichloride. The cut is made with one sweep of the knife and in the cornea. An iridectomy is performed. With the large Indian hook in one hand and the Fisher needle in the other, the pressure is begun on the lower part of the cornea with the Indian hook and the lens followed up until delivered. If the vitreous presents and the eye is in danger, the needle is thrust into the lens, the capsule ruptured, the lens delivered and the capsule falls back in the eye. You are then in about the same condition you would be if you had performed the old classical operation. The iris is then replaced and the eye closed.

The hard part of the operation is the pressure; it must be of the right amount, steady, and let up at the right time. The lens is delivered under the upper lid and as it is not necessary for the patient to keep looking down; this eliminates the greatest danger of loss of vitreous. After the iridectomy you need not again speak to the patient until the operation is completed and then only to tell him to close his eyes. A thin eye pad is put over both eyes and fastened



Fig. 2.

with adhesive, a starch bandage is applied and the patient told to remain quiet until the bandage is dry.

He is left in bed three days and then allowed to sit up. On the fifth day the starch bandage is removed and he is given the use of the unoperated eye, and on the ninth day, the operated eye is opened and as a rule he goes home two or three days later. During this time he has had absolutely no pain. In about six weeks he returns for refraction.

We present to you these cases with their results. Altogether, we consider the method far superior to the old classical one for the following reasons:

First, the cut is made with one sweep of the knife and so does away with the saw tooth edges of the wound, which causes slow healing.

Second, the short stay in the hospital.

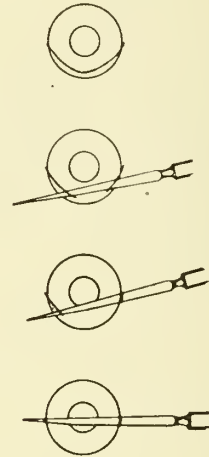


Fig. 3.

Third, no after pains and the complete comfort of the patient except for the blindfold.

Fourth, very little or no iritis.

Fifth, clear pupil and no secondary operation needed.

Sixth, better vision.

#### SUMMARY

We used the Fisher needle in six cases. In three of these cases it was necessary to needle the capsule with a visual result of 20/30, 20/50, 20/60. In the others, the visual results were 20/20, 20/40, 20/50.

The capsule ruptured in delivery in three cases with a vision of 20/30 in one while the other two were not refracted.



There was iris prolapse in four cases with vision of 20/15, 20/30, 20/50, 20/50.

Vitreous loss in seven cases.

No. 20. Put fingers under bandage on fifth day; vision 20/40.

No. 39. Vomited the second day; vision 20/30.

No. 42. Looked down and out when bandage was being placed; said he was trying to see; vision 20/80.

No. 43. Same cause as No. 42; vision 20/100.

No. 47. Iris attached to lens, making very

No. 13. Choroiditis and corneal scars, vision 20/70.

No. 27. Vision was always poor, fundus appears normal, vision 20/200.

No. 32. Vision always poor, eye turned out. Blood clot organized, needled, followed by glaucoma, vision 20/150.

No. 34. Choroiditis, chronic, vision 3/200.

This leaves forty-one cases of completed Smith-Indian-Fisher operations for consideration of the resultant vision.

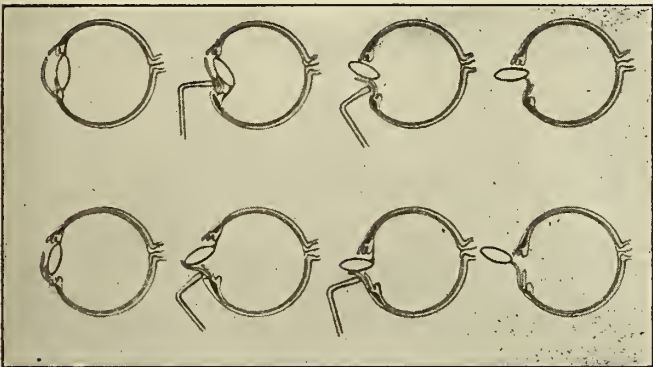


Fig 4.

sudden delivery; vitreous semi-fluid; vision 20/30.

No. 48. Needle was used and vitreous escaped while removing capsule with forceps; vision 20/20.

No. 49. Vitreous loss at operation, following delivery, vision 20/30.

One case had a fluid vitreous in both eyes. The lenses were removed with a loop. The first lens was delivered with capsule; vision 20/20. The second capsule ruptured and was not refracted.

Five cases were not refracted and four following cases were known to be poor eyes to begin with, namely:

#### 50 CASES

|          |               |
|----------|---------------|
| 10 cases | 20/20         |
| 15 "     | 20/30         |
| 6 "      | 20/40         |
| 6 "      | 20/50         |
| 2 "      | 20/60         |
| 1 "      | 20/70         |
| 1 "      | 20/80         |
| 1 "      | 20/100        |
| 1 "      | 20/150        |
| 1 "      | 20/200        |
| 1 "      | 3/200         |
| 5 "      | Not refracted |

#### 41 CASES

|         |               |
|---------|---------------|
| 9 cases | 20/20         |
| 13 "    | 20/30         |
| 5 "     | 20/40         |
| 4 "     | 20/50         |
| 1 "     | 20/60         |
| 1 "     | 20/70         |
| 1 "     | 20/80         |
| 1 "     | 20/100        |
| 1 "     | 20/150        |
| 1 "     | 20/200        |
| 1 "     | 3/200         |
| 3 "     | Not refracted |

|    | Name   | Age | Eye | Used<br>Needle | Vit.<br>Loss | Prol.<br>Iris | Rup.<br>Cap | Hosp.<br>Days | Lenses          | Vision |   |
|----|--------|-----|-----|----------------|--------------|---------------|-------------|---------------|-----------------|--------|---|
| 1  | Mrs. P | 74  | L   |                |              |               |             | 14            | +10.00          | 20/30  |   |
| 2  | Mrs. A | 84  | R   |                |              |               |             | 14            | +11.00+2.00x180 | 20/20  |   |
| 3  | Mr. S  | 71  | R   | Yes            |              |               |             | 14            | +11.00          | 20/60  | 7th Month Capsule needed  |
| 4  | Mr. S  | 71  | L   |                |              |               |             | 14            | +11.00+1.25x10  | 20/20  |   |
| 5  | Mr. D  | 57  | R   |                |              |               |             | 14            | +10.00+2.00x30  | 20/20  |   |
| 6  | Mr. D  | 84  | R   |                |              |               |             | 21            | + 9.00+3.00x180 | 20/50  |   |
| 7  | Mrs. C | 48  | R   |                |              | Yes           |             | 30            | +10.00+4.00x105 | 20/30  |   |
| 8  | Mr. H  | 70  | R   |                |              |               |             | 14            | +13.00+3.50x60  | 20/20  |   |
| 9  | Mr. L  | 77  | R   |                |              |               |             | 14            | +11.00+1.00x180 | 20/30  |   |
| 10 | Miss G | 70  | L   |                |              |               |             | 14            | + 9.00+2.00x30  | 20/30  |   |
| 11 | Miss B | 70  | R   |                |              |               |             | 14            | +12.00+1.00x15  | 20/40  |   |
| 12 | Mr. W  | 72  | R   |                |              |               |             | 14            | + 9.00+4.00x20  | 20/30  | 18th Month Suddenly blind<br>Fundus appears normal.                     |
| 13 | Mr. E  | 58  | L   |                |              |               |             | 14            | +11.00+4.00x60  | 20/70  | Chorioiditis Corneal scars.   |
| 14 | Mrs. G | 78  | R   |                |              |               |             | 14            | +12.00+2.50x180 | 20/30  |   |
| 15 | Mr. P  | 72  | L   | Yes            |              |               |             | 14            | +12.00          | 20/50  | 3rd Month Capsule needed.   |
| 16 | Mrs. H | 64  | R   |                |              | Yes           |             | 30            | +10.00+2.00x90  | 20/50  | Prolapsed iris. Both angles.  |
| 17 | Mrs. P | 79  | R   |                |              |               |             | 21            |                 |        | Cataract Mania.<br>Never refracted.                                     |
| 18 | Mrs. S | 68  | R   |                |              |               |             | 14            | +10.00+3.50x20  | 20/20  | Blood pressure 180.   |
| 19 | Mrs. T | 60  | R   |                |              |               |             | 14            | +13.00+1.00x180 | 20/30  | Blood pressure 170.<br>Very nervous.                                    |
| 20 | Mr. P  | 72  | R   |                | Yes          |               |             | 14            | +10.00          | 20/40  | Finger under bandage.<br>Prolapsed vitreous.                            |
| 21 | Mr. S  | 76  | L   |                |              |               |             | 21            | +11.00+ .50x45  | 20/30  |   |
| 22 | Mr. S  | 65  | R   |                |              |               |             | 14            | +11.00+1.00x180 | 20/40  |   |
| 23 | Mr. F  | 52  | L   |                | Fluid        |               |             | 10            | + 8.00+2.00x180 | 20/40  | Lens removed with loop.   |
| 25 | Mrs. R | 62  | L   |                |              |               |             | 10            | + 9.00+3.00x180 | 20/20  |   |
| 26 | Mr. F  | 67  | L   |                |              |               |             | 7             | +13.00          | 20/20  |   |
| 26 | Mr. F  | 67  | L   |                |              |               |             | 7             | +13.00          | 20/20  |   |
| 27 | Mr. F  | 67  | R   |                |              |               |             | 9             | +13.00          | 20/20  | Vision always poor.<br>Fundus appears normal.                           |
| 28 | Miss P | 63  | R   |                |              |               |             | 12            | +12.00          | 20/50  |   |
| 29 | Mr. P  | 63  | L   |                |              |               |             | 12            | +12.00          | 20/20  |   |
| 30 | Dr. P  | 59  | L   |                |              | Yes           |             | 10            | +13.00+3.50x150 | 20/15  |   |
| 31 | Mrs. K | 73  | R   | Yes            |              |               |             | 9             | +11.50          | 20/40  |   |
| 32 | Mrs. G | 57  | R   |                |              |               |             | 9             | +12.00+2.50x90  | 20/150 | Vision always poor. Organ-<br>ized clot ant. cham.<br>Needed. Glaucoma. |
| 33 | Mr. H  | 56  | L   | Yes            |              |               |             | 10            | +11.00+2.50x90  | 20/30  | 2nd Month. Capsule needed.  |
| 34 | Mr. R  | 67  | R   |                |              |               |             | 7             | + 9.00+4.00x165 | 3/200  | Chorioiditis.   |



|    | Name   | Age | Eye | Used<br>Needle | Vit.<br>Loss | Prol.<br>Iris | Rup.<br>Cap | Hosp.<br>Days | Lenses          | Vision |   |
|----|--------|-----|-----|----------------|--------------|---------------|-------------|---------------|-----------------|--------|---|
| 35 | Mrs. C | 70  | R   |                |              |               |             | 10            | +14.00+1.00x75  | 20/30  |   |
| 36 | Mr. W  | 65  | L   |                |              |               |             | 14            | +10.00+2.00x5   | 20/30  |   |
| 37 | Mr. F  | 75  | L   |                |              |               | Yes         | 33            |                 |        | 1st Month Hemorrhage from<br>over work. Glaucoma.<br>Vision lost. |
| 38 | Mr. F  | 52  | R   |                | Fluid        |               | Yes         | 10            |                 |        | Lens removed with loop.   |
| 39 | Mrs. S | 72  | R   |                |              |               |             | 14            | + 8.00+2.00x30  | 20/30  | 2nd day vomited.<br>Prolapsed vitreous.                           |
| 40 | Mr. G  | 56  | R   |                |              |               | Yes         | 14            | +10.00+4.50x80  | 20/30  |   |
| 41 | Mr. S  | 66  | L   |                |              | Yes           |             | 14            | + 9.00+3.00x45  | 20/50  | Iris prolapsed. Cut off.  |
| 42 | Mr. B  | 78  | R   |                | Yes          |               |             | 37            | +11.00+1.00x90  | 20/100 | After operation looked down.<br>Loss of vitreous.                 |
| 43 | Mr. O  | 60  | R   |                | Yes          |               |             | 21            | +12.00+1.00x90  | 20/80  | After operation looked down.<br>Loss of vitreous.                 |
| 44 | Mrs. P | 63  | L   |                |              |               |             | 10            |                 |        |   |
| 45 | Mrs. H | 81  | R   |                |              |               |             | 12            | + 8.00+4.00x15  | 20/60  | Projection poor.  |
| 46 | Mr. C  | 68  | L   |                |              |               |             | 13            | +10.00+ .75x180 | 20/40  |   |
| 47 | Mr. K  | 65  | L   |                | Yes          |               |             | 13            | +13.00+1.50x60  | 20/30  | Iris attached to lens.<br>Vitreous semi-fluid.                    |
| 48 | Mrs. W | 59  | R   | Yes            | Yes          |               |             | 21            | + 8.50+ .75x15  | 20/20  | Capsule removed with for-<br>ceps. Vitreous loss.                 |
| 49 | Mrs. P | 60  | R   |                | Yes          |               |             | 14            | +11.00          | 20/30  |   |
| 50 | Mr. F  | 62  | R   | Yes            |              |               |             | 14            | +11.00+2.00x25  | 20/50  |   |

## DISCUSSION

DR. F. E. BURCH, St. Paul: There are a good many things I would like to say about the Smith-Indian operation, but I will not do so on account of lack of time. There can be no doubt about certain advantages in the modified Smith operation that are obtained by freedom from trouble with the capsule afterwards and general post-operative interference of any kind. This operation has been discussed so much that almost everyone here knows pretty well how most men feel about the Smith-Indian operation. I think that for every oculist the method of cataract extraction becomes in the end purely a personal equation. It means following a technic which, for his patient, is best adapted to each surgeon and the kind of training the operator has had.

For Dr. Pratt, I am sure this method is the method of choice for him and for his patient. He has acquired a technic and he knows how to apply just the right amount of pressure on the cornea. He feels that the best results are obtained by this method.

There has always been a difference of opinion about this operation among the oculists who do not do it. The reasons are based primarily upon a fear of a loss of vitreous. Personally, I believe that the fear

of loss of vitreous is well proven. A good many experienced operators have undertaken to do the original Smith operation and many of them have frankly reported loss of vitreous during extraction which exceeded by far that which occurred by the ordinary methods. Herbert, in his book on cataract, reported some operators had obtained as high as 33 per cent loss of vitreous. Loss of vitreous is really harmful. Many of these patient lose a little vitreous which does no harm at the time, but even though they have good vision for a year or so, in the end vision is not as good as where no vitreous is lost. I cannot escape from the thought that extraction of the lens and leaving the capsule is the better method, because after the lens is removed I believe the capsule still affords valuable support for the vitreous.

It seems best that each operator follow the technic which is most satisfactory for his own use, after he has acquired a certain experience and training in the technic which suits him. I am sure the results in Dr. Pratt's series of cases are as good as any I have seen. They are unusually good, better than most of us obtain by the old standardized method.

DR. WILLIAM BENEDICT, Rochester: In going

over this report of Dr. Pratt's I was struck by the frequency with which he was able to remove the lens with the capsule in its entirety. If we leave out those cases in which he found it necessary for some reason or other to needle the lens or those in which the lens capsule ruptured, we still have 82 per cent of total extractions.

I think the reason the Smith operation is not followed by more operators is because Smith discouraged its use among those who could not quickly learn its technic and among those who were doing less than 100 cataracts a year. He thought it necessary to do a large number of operations to keep one's hands well trained.

The advantages of the intracapsular extraction where it can be successfully done are certainly manifest. The iritis that occurs following the capsulotomy operation is the greatest bugbear with which the operators have to contend. We are already convinced that the greatest part of the cyclitic reaction is due to contact of the cortical portion of the lens with the iris. That can be avoided by the Jackson operation, in which he splits the upper part of the equator of the lens, spilling none of the lens substance, or completely removing the cortical substance by use of an irrigator.

DR. C. N. SPRATT, Minneapolis: The essayist in his remarks has given one view of the intra-capsular operation and when so presented to this society it is proper that attention should be called to some of the objections to the method.

In the first place this operation is not the one of choice of the majority of the leading American and European operators. But it has been exploited by a comparatively few men, many of whom have nothing more than a local reputation.

Sharp, a British surgeon in 1753 gave a clear description of the operation of extraction in capsule. Since then at various times other operators have revived or modified the method in the attempt to achieve the ideal. The Pagenstecher brothers, whose names deserve to be associated with the operation as much as any others, wrote in 1866 as follows:

"The extraction of the crystalline lens within its capsule removes all predisposition to an inflammatory process on the part of the iris. In the 200 cases on which we have operated, we have not observed a single primary iritis. This operation excludes all secondary operations. The acuteness of vision is greater after this operation than after any other. Twelve times out of a hundred the acuteness becomes normal. While it presents all these advantages this operation does not entail more total losses of eyesight than ordinary extraction. The defects of this operation consist in the difficulty of operative technic and in reaching an exact diagnosis in certain cases. Granting that the freedom from iritis and the advantage in following the operation with a secondary does the intra-capsular operation offer as large a

percentage of useful eyes as does the classical, simple or combined operation".

Our essayist mentions the point of the short stay in the hospital. Time is not the most important thing that is to be considered. The ordinary patient that goes to the hospital for a cataract operation can just as well stay fourteen days as twelve. After the combined operation my patients stay on an average of from eight to nine days in the hospital.

There is no question that iritis is less common after the intra-capsular operation than after the combined.

One of the most serious drawbacks of the intra-capsular operation is the loss of vitreous. I am one of those who believe that loss of vitreous is a complication and should be avoided if possible as it is generally held that the vitreous does not regenerate. In my last fifty cases done by the simple or combined method 4 (8 per cent) have suffered a loss of vitreous. Major Smith, a most expert operator, has a loss of 6 or 8 per cent with the intra-capsular, other operators report from 14 to 25 per cent. Of my four cases in which this accident occurred, one developed iridocyclitis with loss of the eye, a second patient had 5/9 vision two months after operation but some six months later total loss with irido cyclitis. The third patient had 5/12 and the fourth patient had 5/5.

As to the comparative visual results of the two operations so much depends on the accuracy of the refraction, the type of cataract operated upon and the honesty of the individual reporting the case.

In my 50 cases I have not included any eyes that had complications. As stated before two eyes were lost and one patient, a man age 88, never returned for glasses so that the vision could not be recorded.

Of these 47 patients fitted to glasses, 37 (74%) had normal vision or better and over one-half of these had 5/4 or better, of the remaining 10, 6 patients (12%) had 5/9 or better, 3 patients (6%) had 5/12 and 1 patient 5/50.

Secondary operations were necessary in 13 patients (26%).

DR. F. J. PRATT, Minneapolis, (closing): I can make no comparisons with the classical method except with this one by Harrison Butler in the British Journal of Ophthalmology, July, 1919. He says: "I needle 22 per cent of my cases. Most surgeons needle more frequently. I ascribe my low figure to three circumstances. One is that I generally perform a preliminary iridectomy; another that I rarely operate until the cataract is mature; and last that if the patient is perfectly satisfied with 6/12 (20/40), I do not needle to get better acuity. I lost two eyes after dissection so I never tempt Providence if I can avoid it."

I would never attempt a real Smith-Indian operation because, if vitreous presents, there is nothing to do but keep on pressing. The reason we follow Fisher is because of his needle which you use if



vitreous presents, making the operation safe. So far our experiences show that we would rather lose a little vitreous and remove the capsule than we would to leave the capsule. Our results have shown that we have less trouble with the patients after operation and better vision.

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## THE RELATION OF HEPATITIS TO CHOLECYSTITIS\*†

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WM. CARPENTER MACCARTY, M. D.

ARNOLD JACKSON, M. D.

*Rochester, Minn.*

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In 1910 one of us (MacCarty) emphasized the close anatomical, physiological, and pathological relationship of diseased conditions of the stomach, duodenum, gall-bladder, liver and pancreas and at that time the gastro-duodeno-hepatico-pancreatic physiological system was described. An endeavor was made to arouse investigators, especially clinicians and surgeons, to the importance of this group of organs from the standpoint of clinical and surgical diagnosis and treatment and also to show that disease in one of these organs is frequently if not always associated with changes in one or more of the others. In another article was pointed out that there is apparently a sequence of events in the development of pathologic conditions in this group of organs. This sequence begins apparently with appendicitis—possibly antedated by typhlitis—and passes through pylorospasm, duodenitis, duodenitis ulcerosa, cholecystitis and hepatitis, cholelithiasis, pancreatitis, gastric ulcer, and gastric carcinoma. It was not suggested that a given patient would necessarily have all of these conditions in sequence but that anyone having one usually had some signs of having had one or

more of those preceding their condition in the sequence.

As a result of the pathological and clinical facts, which led to this conception of possible pathologic relationship and sequence, continued observations have been made. As a part of this investigation a large number of livers associated with cholecystitis have been studied during surgical operations. While the series of specimens herewith reported includes only fifty-eight cases, it represents but a part of about one hundred and fifty-five which have been studied, the first series having been studied by means of fresh frozen sections of small pieces of the liver removed at the time of cholecystectomy. Most of the fresh specimens were utilized merely to obtain a preliminary plan for investigation of the problem. The specimens reviewed in the first series were too small for further study in a fixed condition. The fresh tissue examination revealed that many livers associated with cholecystitis were diseased.

A somewhat similar investigation was conducted by Graham in 1918; his series consisted of thirty cases of which detailed reports were made in eight. Graham's cases were subjects of acute cholecystitis and hepatitis. He states that 87 per cent of his series of cholecystitis was associated with enlarged livers and compares this high figure with that of Kehr who reported that from 15 to 20 per cent of cholecystitides is associated with hepatic enlargement. Ninety per cent of the gall-bladders operated upon at the Mayo Clinic are chronically inflamed. Thus in one series of 4,824 gall-bladders which have been reported, 4,430 or 91.9 per cent was chronically diseased. In the series of fifty-eight cases, herewith reported as having been studied in relation to hepatitis, 81 per cent showed chronic inflammation. The livers were studied independently of any knowledge of the condition of the gall-bladder. They represent portions of the liver near the gall-bladder and some distance away from it.

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\*The study of liver specimens removed at operation was made at the suggestion of Dr. Wm. J. Mayo who, with his associated surgeons, furnished the material.

†Read before the Southern Minnesota Medical Association, Mankato, Minnesota, November, 1920.

## GALL-BLADDER

1. Subacute catarrhal cholecystitis associated with chronic catarrhal cholecystitis with partial destruction of mucosa. Thickened walls. Cholelithiasis (one stone in common duct and one in gall-bladder).
2. Chronic catarrhal cholecystitis. Cholelithiasis (multiple stones).
3. Slight chronic catarrhal cholecystitis.
4. Chronic catarrhal cholecystitis.
5. Chronic catarrhal cholecystitis papillomatosa ("strawberry" gall-bladder). Cholelithiasis (one stone).
6. Subacute cholecystitis (empyema). Cholelithiasis (one stone, 23x15mm.).
7. Chronic catarrhal cholecystitis (early "strawberry" gall-bladder). Bile sand.
8. Chronic cholecystitis with thickened walls. Scars of two perforations of the gall-bladder wall.
9. Cholecystitis. Gall stones.
10. Chronic catarrhal cholecystitis with thickened walls. Granular mucosa. Cholelithiasis.
11. Chronic catarrhal cholecystitis. Complete destruction of mucosa. Thin bile.
12. Subacute purulent cholecystitis with thickened walls. Partial destruction of mucosa. (Empyema). Cholelithiasis (stone in common duct).
13. Chronic catarrhal cholecystitis with multiple small stones.
14. Subacute cholecystitis associated with chronic cholecystitis with markedly thickened walls. Peri-cholecystitis. Cholelithiasis.
15. Chronic catarrhal cholecystitis (very early "strawberry" gall-bladder).
16. Chronic catarrhal cholecystitis (very early "strawberry" gall-bladder). Cholelithiasis. Dirty bile.
17. Chronic catarrhal cholecystitis with slightly thickened gall-bladder walls.
18. Subacute cholecystitis associated with chronic cholecystitis. Markedly thickened walls. Cholelithiasis.
19. Acute gangrenous cholecystitis with thick edematous gall-bladder walls. Dirty mucoid bile. Lymphocytic infiltration.
20. Chronic catarrhal cholecystitis ("strawberry" gall-bladder).
21. Chronic catarrhal cholecystitis.
22. Chronic catarrhal cholecystitis with multiple small stones.
23. Chronic cholecystitis papillomatosa.
24. Subacute purulent cholecystitis (empyema) associated with chronic cholecystitis. Markedly thickened gall-bladder walls. Cholelithiasis (multiple stones).
25. Slight chronic catarrhal cholecystitis.
26. Chronic catarrhal cholecystitis. Cholelithiasis (one stone, 3 cm. in diameter).
27. Chronic catarrhal cholecystitis. Ulceration and destruction of mucosa at fundus. Thickened walls of gall-bladder. Cholelithiasis (multiple stones).
28. Chronic cholecystitis with multiple scars in gall-bladder wall.
29. Chronic catarrhal cholecystitis with slightly thickened gall-bladder walls. Cholelithiasis (one stone, 2 cm. in diameter).

## LIVER

Typical biliary cirrhosis showing large bile ducts and the portal vein surrounded by loose scar tissue infiltrated with leucocytes and rich in young, sprouting bile ducts.

Lymphocytic infiltration. Bile stasis.

Normal? Some crenation of the liver capsule and rather dense connective tissue around bile vessels. Some lymphocytic infiltration.

Normal? Slight lymphocytic infiltration. Lymphocytic infiltration and fibrosis.

Marked fibrosis. Lymphocytic infiltration. Atrophy of liver cells.

Marked fibrosis and lymphocytic infiltration.

Lymphocytic infiltration. Vacuolization and disintegration of hepatic cells.

Marked hepatic intracellular pigment. Condition of small blood vessels suggestive of being the origin of the "syncytial" cells. Leucocytic infiltration. Extracellular pigment.

Lymphocytic infiltration? "Normal".

Lymphocytic infiltration.

Lymphocytic infiltration, fibrosis and atrophy of liver cells.

Marked lymphocytic infiltration, fibrosis, atrophy of cells. Distortion of tubules.

Lymphocytic infiltration. Atrophic blood vessels and fibrosis.

Lymphocytic and leucocytic infiltration. Atrophy and disintegration of liver cells.

Lymphocytic infiltration.

Fibrosis. Lymphocytic infiltration. Destruction of liver cells.

Atrophy and disintegration of liver cells.

Lymphocytic infiltration.

Vacuolization of liver cells. Marked lymphocytic infiltration. Atrophy of liver cells. Marked distortion of intracellular spaces.

Lymphocytic infiltration.

Lymphocytic infiltration.

Lymphocytic infiltration and fibrosis.

Marked fibrosis and lymphocytic infiltration.

Atrophy and flattening of liver cells. Marked thickening of Glisson's capsule. Lymphocytic infiltration. Hyalinized fibrosis around bile vessels.

Lymphocytic infiltration.

Lymphocytic infiltration. Some fibrosis. Small amount of leucocytes between liver cells. Thickened Glisson's capsule. Flattened liver cells.

Slight lymphocytic infiltration. Fibrosis. Hemosiderin present.

Marked lymphocytic infiltration. Some fibrosis.



30. Chronic cholecystitis. Cholelithiasis (multiple stones). Lymphocytic infiltration.
31. Chronic catarrhal cholecystitis. Some lymphocytic infiltration.
32. Chronic catarrhal cholecystitis (contracted gall-bladder). Cholelithiasis (one stone, 1 cm. in diameter). Irregular thickening of Glisson's capsule.
33. Chronic catarrhal cholecystitis (early "strawberry" gall-bladder). Fibrosis (early cirrhosis). Some lymphocytic infiltration.
34. Chronic catarrhal cholecystitis ("strawberry" gall-bladder). Slightly thickened gall-bladder walls. Cholelithiasis (stone, 3cm.x5mm.) Lymphocytic infiltration.
35. Chronic catarrhal cholecystitis (very early "strawberry" gall-bladder). Specimen unsatisfactory.
36. Acute cholecystitis associated with chronic cholecystitis with thickened gall-bladder walls. Cholelithiasis (multiple stones). Marked peri-hepatitis and lymphocytic infiltration of liver.
37. Slight chronic catarrhal cholecystitis. Cholelithiasis (multiple stones). Marked lymphocytic infiltration.
38. Chronic catarrhal cholecystitis with thickened gall-bladder walls. Trabeculation of mucosa. Cholelithiasis (multiple stones). Fatty degeneration of liver cells. Some lymphocytic infiltration.
39. Chronic catarrhal cholecystitis (early "strawberry" gall-bladder). Cholelithiasis (multiple stones). Marked lymphocytic infiltration.
40. Chronic catarrhal cholecystitis with partial destruction of mucosa. Thickened gall-bladder walls. Cholelithiasis (multiple stones, largest 2 cm. in diameter). Marked lymphocytic infiltration and some fibrosis.
41. Chronic catarrhal cholecystitis (early "strawberry" gall-bladder). Slightly thickened gall-bladder walls. Thick tarry bile. Some lymphocytic infiltration. Some fibrosis. Hemorrhage in liver substance.
42. Acute necrotic purulent cholecystitis (empyema). Cholelithiasis (multiple stones). Lymphocytic infiltration.
43. Acute purulent cholecystitis (empyema) associated with chronic cholecystitis with thickened gall-bladder walls. Cholelithiasis (one stone, 7 mm. in diameter). Slight lymphocytic infiltration. Glisson's capsule thickened. Marked fibrosis.
44. Chronic catarrhal cholecystitis (early "strawberry" gall-bladder). Marked lymphocytic infiltration. Fibrosis. Atrophy of liver cells. Proliferation bile duct.
45. Chronic catarrhal cholecystitis with areas of hyperplastic mucosa. Cholelithiasis (one stone, 1x1cm.x8mm.) Fistulous tract connecting with skin. Marked lymphocytic infiltration. Some fibrosis. Marked thickening of Glisson's capsule.
46. Chronic catarrhal cholecystitis. Very slight lymphocytic infiltration.
47. Chronic catarrhal cholecystitis with thickened gall-bladder walls. Contracted gall-bladder. Cholelithiasis (one stone from common duct). (Multiple stones). Marked lymphocytic infiltration. Marked destruction and atrophy of liver cells.
48. Chronic catarrhal cholecystitis. Cholelithiasis (multiple stones, largest 1 cm. in diameter). Lymphocytic infiltration. Fibrosis. Atrophy of liver cells.
49. Chronic catarrhal cholecystitis with thickened gall-bladder walls. Cholelithiasis (largest stone, 2 cm. in diameter). Marked lymphocytic infiltration. Fibrosis. Flattening of liver cells.
50. Chronic catarrhal cholecystitis? Lymphocytic infiltration. Fibrosis. Flattening of liver cells.
51. Chronic catarrhal cholecystitis ("strawberry" gall-bladder). Lymphocytic infiltration.
52. Slight chronic catarrhal cholecystitis. Extensive subcapsular lymphocytic infiltration and fibrosis. Peri-ductal lymphocytic infiltration. Fibrosis.
53. Chronic catarrhal cholecystitis. Cholelithiasis (multiple stones). Lymphocytic infiltration.
54. Chronic catarrhal cholecystitis. Lymphocytic infiltration. Fibrosis.
55. Chronic catarrhal cholecystitis. Subcapsular hepatic cellular atrophy.
56. Chronic catarrhal cholecystitis. ("strawberry" gall-bladder). Intercellular hepatic lymphocytic infiltration and fibrosis. No peri-ductal infiltration or fibrosis.
57. Chronic catarrhal cholecystitis with thin gall-bladder walls (cystic). Cholelithiasis (one stone, 1.5 cm. in diameter completely obstructing cystic duct). Lymphocytic infiltration. Fibrosis. Cellular atrophy.
58. Subacute cholecystitis associated with chronic cholecystitis with thickened gall-bladder walls. Peri-cholecystitis with adjacent hepatitis. Cholelithiasis (one stone, 1.5 cm. in diameter) Cholecysto-duodenal fistula. Lymphocytic infiltration, fibrosis and hepatic cellular atrophy.

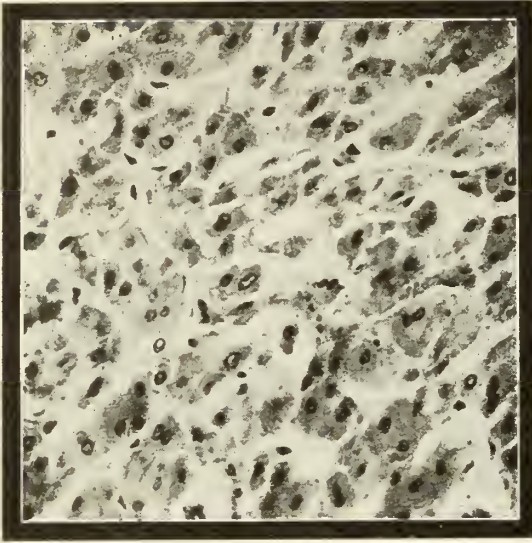


Fig. 1.

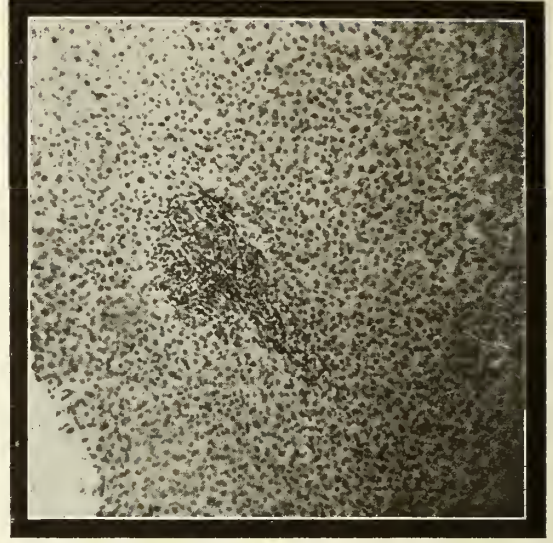


Fig. 3.

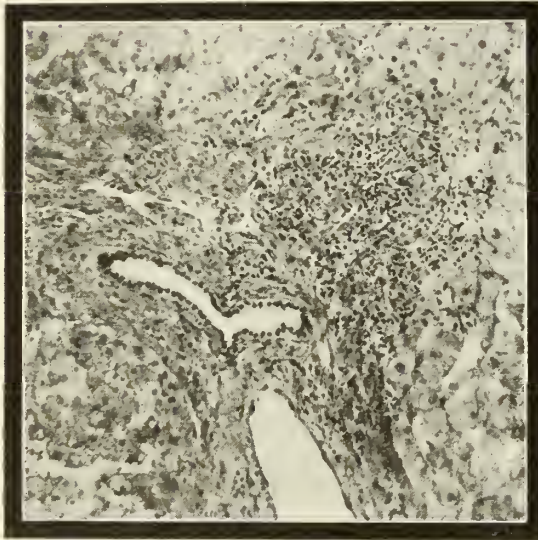


Fig. 2.

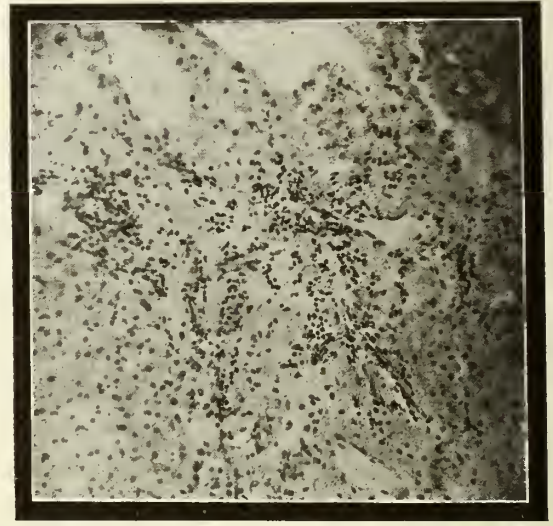


Fig. 4.

Figs. 1, 2, 3, 4. Photographs showing degrees of lymphocytic infiltration, fibrosis and hepatic cellular distortion in chronic hepatitis associated with chronic cholecystitis.

The inflammatory reaction in the liver may be summarized by stating that it consists of periductal lymphocytic infiltration, and fibrosis, both processes sometimes extending between the columns of liver cells, which are occasionally atrophic, vacuolated, or distorted. Extra- and intra-cellular pigment is occasionally present, and small bile ducts are sometimes partially destroyed. The reaction varies in amount, the degree of reaction apparently bearing no direct re-

lationship to the degree of reaction in the gall-bladder.

This study and that of Graham has one fault, i. e., that the left lobe of the liver was not studied as a control in all cases. However, this series embraces many specimens which were taken some distance from the gall-bladder which indicates that if the inflammatory reaction is direct from the gall-bladder by continuity then a large portion of the liver is frequently involved



in cholecystitis, a fact to be considered in treatment, the liver being, therefore, also a focus of infection as well as a possible source of general disturbance from interference with normal hepatic functions. Such a condition, remaining in the liver after cholecystectomy or cholecystostomy, might readily explain, at least in part, the fact that some cases, following cholecystectomy or cholecystostomy, continue to have trouble, indeed "attacks" similar to their pre-operative attacks.

#### CONCLUSIONS

1. Chronic cholecystitis is very frequently if not always associated with chronic hepatitis.
2. The fact that chronic hepatitis is an almost constant finding in cholecystitis suggests that the general obscure symptoms which frequently occur in association with cholecystitis may have their origin in chronic disturbances of hepatic functions.
3. The presence of chronic hepatitis in association with chronic cholecystitis may account for the recurrence of symptoms following a certain percentage of cholecystectomies and cholecystostomies.

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#### DISCUSSION

DR. H. E. ROBERTSON, Minneapolis: I am sorry Dr. MacCarty did not discuss the relation between acute hepatitis and chronic hepatitis. When we perfuse an animal's liver with fluid containing micro-organisms, the fluid coming out of the liver contains fewer bacteria because they are taken up by the endothelial cells lining the liver sinusoids. If these bacteria proliferate, there will be injury to the liver cells adjacent to them, and later on fibrosis. Those changes which go on in the liver go on in the spleen,

in the appendix and related structures. As pointed out a number of years ago, they go on constantly during our lives, and it is in the resultant chronic conditions that we have made less progress than in any of the infections with which surgeons and medical men have to deal. We conclude that chronic conditions are in a class by themselves; probably they are not caused by bacteria and we talk vaguely about poisons that are absorbed from the gastrointestinal tract, about the drunkard's liver, and so on. There is no question in my mind but what bacteria of a low grade of virulence may do damage constantly or may have done a small amount of damage, and that keeps on recurring from time to time.

The relation and association of these organs with pathologic micro-organisms is always apparent as Dr. MacCarty has plainly shown; that is, if we have one diseased organ in the body, the chances are that diseased organ will be an index of what may occur in neighboring related organs. The removal of the source of this infection if we can only find it, is the ideal to be desired, and oftentimes the removal of the gall-bladder proves that very thing. We must not forget also that the liver is capable of repair, and the removal of the source of infection may make possible a repair that will preserve normal vital functions.

In regard to the essential relation of these lesions, Dr. MacCarty has pointed out that almost every single liver in individuals passed the age of 40, the same as every single aorta in individuals of the same age, showed chronic changes. There is more or less disease always present in so-called normal individuals above 40. Such a fact should make us careful in our estimation of complicating condition found at surgical operations.

DR. MACCARTY (closing the discussion): There is one false clinical deduction which some one is going to make as the result of the report of these cases, and that is the reason I did not say too much. A long paper might have been written on the subject from our experience; but I merely made a report of the findings, and we may draw conclusions sometimes later.

Some one will say, why remove the gall-bladder if the liver is diseased? I am going to answer that by saying, why remove a small carcinoma of the breast when you know there is a possibility of carcinoma being somewhere else in the body? If the gall-bladder is the seat of infection, take it out. If you cannot take out the liver, there is no reason why you should not take out the gall-bladder. We must still continue to do cholecystectomies and cholecystostomies in spite of the fact that the liver is frequently involved. We must not draw a false clinical deduction which we might easily do.

Another point which was brought up is that there is one great failure in surgery, as it has been ordinarily practiced. For instance, given a duodenal ulcer, the surgeon does gastroenterostomy, turns the patient loose, and later the patient returns with all of the symptoms he had before operation. I do not believe

that is the proper way to do surgery. I do not believe it is proper to do cholecystectomy and dismiss the patient without some instructions, because when you remove the gall-bladder, you are not always removing the etiological factor in cholecystitis. Every surgical patient should also be treated as a medical patient, and his general condition should be taken care of, and a real surgeon I think will always do that.

I shall not go into that phase of the discussion which was alluded to by Dr. Robertson, namely, about the chronic changes which go on in a series of organs as that is a long story, and if I had time I should like to show some lantern slides. I have presented observations which show that diseases in these various organs, if we take their histories into consideration have an onset which appears in certain sequence, so that from the laboratory, as a matter of experiment, we have frequently taken the age of the patient and a history abdominal disturbances and prophesied the pathologic findings which we would find in the operating room, and I do not say we are 100 per cent correct but we were correct in a high percentage of cases. That is one of the interesting features in connection with the pathology and with our association with surgeons; we can correlate the surgical findings with the pathology which we see in the laboratory. It makes us better pathologists as well as helps the surgeon.

## PHYSICAL SIGNS OF EARLY PULMONARY TUBERCULOSIS\*

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Early pulmonary tuberculosis may mimic any disease the thoracic viscera are heir to, consequently the detection of early tuberculosis is not an easy task; on the contrary, one requiring great care in order to minimize error.

The first diagnostic step in the examination of a tuberculous suspect is a careful, painstaking history, including symptomatology. The second diagnostic step is a thorough physical examination. The third step is the application of the laboratory tests—examination of the sputum, use of tuberculin and the x-rays.

*Inspection.* The general appearance of the patient as evidenced by his nutrition, color of skin, facial expression, attitude, and type of chest, means much to the experienced clinician, and often tips the balance in favor of a correct diagnosis. Inspection of the chest should be

made with the entire thorax bare in the case of males and with a light covering of the lower half of chest in females.

The condition of the circulatory system should be ascertained before investigating the respiratory system. The irritable heart, accentuated pulmonary second sound, characteristic pulse, and low blood pressure are valuable early signs. The upper respiratory tract, nose, throat and sinuses, should be carefully investigated before proceeding with the chest examination. In incipient tuberculosis inspection of the chest is practically negative unless there has been a previous pleurisy.

The respiratory movements should be carefully noted,—slight lagging on the affected side occurs early, especially noticeable in the female owing to superior costal type of breathing. Expansion becomes more and more diminished over the affected side and more distinctly apparent owing to superior costal type of breathing. Expansion becomes more and more diminished over the effected side and more distinctly apparent, owing to increased functional activity of the other lung as the disease advances.

*Thermometry* affords valuable information if systematically carried out; increased afternoon temperature is an early symptom, often preceding for a considerable time cough, expectoration, or the presence of tubercle bacilli. The temperature should be taken at least four times daily for a period of several days.

*Palpation* confirms inspection as to findings and enables us to definitely locate areas of increased fremitus, providing we bear in mind the slight normal increase of fremitus over the upper portion of right lung. (Palpation is of little value in the detection of early tuberculosis).

Diminished unilateral expansion or lagging is elicited best by standing behind the patient and grasping the upper portion of the chest, thumbs posteriorly and the palmar surface of the fingers pressed against the upper portion of the anterior chest. Palpation may also elicit muscle spasm over the involved side.

*Percussion* should be carefully and systematically performed during quiet breathing, and at the end of both expiration and inspiration, varying the force and direction of the percussion stroke over the entire lung area. The existence

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normally of a slightly higher pitch of the percussion note over the upper portion of the right lung should be borne in mind. Owing to the small size and often deep location of tuberculous areas, relaxation of surrounding healthy tissue results, which gives rise first, not to dullness but to a slightly tympanitic note; later, as the consolidation increases in degree and extent, tympany is replaced by slight dullness. Finger-finger percussion has the added advantage of enabling the clinician to estimate tissue resistance, often of more importance than the percussion note.

*Auscultation* is the court of highest appeal, since it furnishes us the earliest as well as the most direct and valuable evidence on which to base a diagnosis of early tuberculosis. It should include the careful investigation of the breath, voice, cough, and adventitious sounds, bearing in mind the fact that the respiratory murmur is slightly harsher, higher in pitch and of greater intensity on the right side, especially over the upper portion of the lung.

The earliest pathologic change in the respiratory sounds due to tuberculous infiltration will be found to be diminished intensity of breath sounds or slightly increased harshness noticeable during the slightly prolonged and higher pitched expiration. Interrupted or cog-wheel respiration has but little diagnostic significance, unless supported by other evidence of disease.

Accompanying the slight changes in the breath sounds, on requesting the patient to breathe deeply or to cough, a few feeble, distant crepitant or subcrepitant rales are heard. As a rule localized crepitant rales are best elicited by the post-tussive method—breathe out, cough, and quickly breathe in, continue as stethoscope is moved from point to point over the apices. In some patients you develop crepitation more distinctly at the end of deep inspiration, or during the forcible cough immediately following a deep inspiration. These early adventitious sounds, if localized and persistent, point very definitely to tuberculous infiltration. Over the affected area the voice sounds early show increased intensity, later a raised pitch; especially is this true of the whispered voice.

Given a history of one or more hemorrhages, of pleurisy, or of fistula in ano, the presence of cough, with or without expectoration, loss of

weight and strength, increased pulse rate and slight afternoon temperature, with localized, moist rales in the upper portion of one lung, regardless of sputum findings, you are dealing with active or clinical pulmonary tuberculosis, which will be confirmed by tuberculin and the radiograph. We should also bear in mind that the patient free from cough, temperature, loss of weight, and with a normal pulse rate is free from active pulmonary tuberculosis.

*Differential Diagnosis.* Early pulmonary tuberculosis may be confused with pulmonary syphilis, influenza, maglinant disease of the lung, actinomycosis, and pneumoconiosis.

Pulmonary syphilis is not a common disease, but is liable to be confused with tuberculosis, especially if it involves an upper lobe. We are not permitted to select our ancestors, consequently anyone may be infected with syphilis; and no one is able to control his early environment, hence anyone may have tuberculosis, or the individual may suffer from both infections at the same time. Tuberculosis usually begins at the apex, syphilis at the base or hilus.

Given a case resembling early tuberculosis, in which tubercle bacilli are persistently absent from the sputum, general nutrition good, absence of temperature, dyspnea out of proportion to the lesion, absence of localized crepitation, free apices, positive Wassermann and negative tuberculin test, you are dealing with pulmonary syphilis.

Influenza in the form of post-influenzal lung, is frequently mistaken for tuberculosis. It is characterized by localized crepitant and subcrepitant rales, occasionally limited to the upper portion of one lung, but more often scattered throughout the lung, accompanied by cough, expectoration, and temperature, thus presenting a clinical picture not unlike that of early tuberculosis. Fortunately the pulmonary sequelae of influenza are very seldom tuberculous in character. Fishberg states that of the hundreds of cases of influenza coming under his observation during the late war, in which cough, expectoration, and temperature persisted after influenza, but one proved to be tuberculous.

Malignant disease of the lung, carcinoma, or sarcoma, may be either primary or secondary, the latter occurring in early life, the former late in life. The clinical history is one of irritable,

unproductive cough; dyspnea progressive in character, increasing on exercise; temperature tardy in appearance but present sooner or later. Pain is present, accompanied by a feeling of fullness and constriction within the chest. Hoarseness and aphonia are present if the recurrent is involved. The physical signs will depend largely on where the growth is situated. Diminished expansion over the involved side, palpable supraclavicular and axillary glands, dulness and increased resistance on percussion, accompanied by diminished breathing and adventitious sounds on auscultation comprise the early physical signs. The early differential diagnosis of primary cancer of the upper lobe from early tuberculosis is often a difficult task.

Pneumoconiosis, an occupational disease caused by the inhalation of inorganic dust, and characterized by pulmonary fibrosis, is frequently confused with early pulmonary tuberculosis. The patient's occupation, the tendency to early hilus fibrosis and more marked changes, usually in the right lung as shown by the radiograph, and persistent negative sputum, all point emphatically to pneumoconiosis.

Pulmonary actinomycosis may arise through inhalation of dust or secondarily by extension from the neck. It is characterized by cough, often blood-tinged expectoration, irregular fever, loss of flesh, presence of actinomycetes in the sputum, and persistent absence of tubercle bacilli.

I recall hearing that prince of clinicians, Sir William Osler, once say that when we think of tuberculosis, cancer, or syphilis we should also think of the possibility of actinomycosis.

The writer holds that bronchitis, bronchiectasis, broncho-pneumonia, and lobar pneumonia have little in common with early pulmonary tuberculosis, consequently need not be considered at this time.



## CLASSIFICATION AND SYMPTOMATOLOGY OF PULMONARY TUBERCULOSIS\*

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### CLASSIFICATION

The satisfactory classification of tuberculosis for general use and acceptance has always been a difficult task. As knowledge of the disease progressed, such men as Bayle, Laennec, Grancher, Frankel, Meissen, Sokolowski, Loomis, King, Williams, Cornet, Turban, Brown, Trudeau, Rathbun and others have set forth their ideas attempting a working classification with the information at hand. To classify not too arbitrarily a disease with such protean manifestations and with such wide discrepancies between clinical and pathological activity especially since the x-ray has entered the field of diagnosis, has been recognized as one of the problems of the National Tuberculosis Association. To use a terminology and classification of clinical groups which are produced by the reciprocal action between the severity and channels of infection, virulence and dosage on the one hand and the resistance of the organism on the other, offers considerable difficulty.

Dr. E. R. Baldwin, acting as President of the National Association, appointed a Diagnostic Standards Committee. With the cooperation of the Framingham Community Health and Tuberculosis Demonstration representatives, this committee prepared with considerable work, a set of standards for diagnosis and classification. Dr. W. L. Rathbun very happily suggested a separate grouping of lesions and symptoms making it possible to classify any case according to the exact pulmonary involvement and nature of symptoms. Any case of tuberculosis may be labeled exactly by this method which has been adopted by the American Sanatorium Association.

This schema admits of the following combination.

### LESIONS

*Incipient.* Slight infiltration limited to the apex of one or both lungs, or a small part of one lobe; no tuberculous complications.

\*Read before the Minnesota State Medical Association, St. Paul, October, 1920.



*Moderately advanced.* Marked infiltration, more extensive than under incipient, with little or no evidence of cavity formation; no serious tuberculous complications.

*Far advanced.* Extensive localized infiltration or consolidation in one or more lobes; or disseminated areas of cavity formation; or serious tuberculous complications.

#### SYMPTOMS

A. (Slight or None) Slight or no constitutional symptoms, including particularly gastric or intestinal disturbance, or rapid loss of weight; slight or no elevation of temperature or acceleration of pulse at any time during the 24 hours; expectoration usually small in amount or absent; tubercle bacilli may be present or absent.

B. (Moderate) No marked impairment of function, either local or constitutional.

C. (Severe) Marked impairment of function, local and constitutional.

The above practical arrangement is an improvement on the older ones such as the much used lobe classification of Turban which is based on physical signs alone. Although it does not include a working application of the x-ray diagnosis of the stage of the disease it does admit of such a classification being added such as the following suggested by L. Brown, Heise and Sampson who, however, prefer the word minimal to incipient since the latter implies time.

#### I. INCIPIENT (OR MINIMAL):

X-ray findings to show a total area involved (parenchymatous) not greater than the area to the level of the second chondrosternal junction on one side (both sides may be involved) in the form of scattered mottling, or an intense shadow interpreted as pleuritic.

#### II. MODERATELY ADVANCED:

X-ray findings to show an intense shadow, not interpreted as pleuritic, of no greater extent than the area above the upper level of the fourth chondrosternal junction on one side; or areas of rarefaction interpreted as cavities limited to one interspace; or scattered mottling over a greater area than under Minimal, but not greater than the area of one entire lung and to the level of the second chondrosternal junction on the opposite side.

#### III. FAR ADVANCED:

X-ray findings to show an intense shadow, not interpreted as pleuritic, of greater extent than

the area to the level of the fourth chondrosternal junction, or areas of rarefaction interpreted as cavities, greater than one interspace, or scattered mottling greater in extent than under moderately advanced.

#### SYMPTOMATOLOGY

The diagnosis of early pulmonary tuberculosis belongs to the general practitioner. The clinician and patient are concerned chiefly with active tuberculosis and only indirectly with infection.

Out of a hundred patients that the clinician will examine probably seventy will have a tuberculous infection and of the seventy infected about four or five have or will develop the disease tuberculosis. As a physician he is interested in the marks of infection but he is deeply concerned in recognizing the early manifestations of the few diseased. The greatest progress will be made when every physician can recognize these early symptoms and signs that in a great measure enable him first to sort the diseased from the infected and second to be able to diagnose tuberculosis early enough to do the patient some good. It is not the physician who uses hair-splitting methods to detect the slightest lung changes or the one who gives a knowledge of the incidence of tuberculous lesions or even the one who attempts to determine those who will subsequently develop pulmonary tuberculosis who is going to do the most good.

Old burnt-out lesions, the only evidence of previous infection, are almost universally present and as such offer difficulty in the diagnosis of the disease. The physical examination in the diagnosis of tuberculosis, therefore, takes its value only when correlated with the associated symptoms and signs. As Lawrason Brown points out, symptoms indicate that a patient is sick while physical signs show only the mischief done, the former being a better and more active guide to activity than the latter. Furthermore, symptoms without physical signs demand treatment but physical signs without symptoms frequently require only careful watching. Symptoms tell us what is happening and the general condition is more important than the history or the physical signs. Dr. Trudeau used to say to his patients, "I am not concerned about the extent of your disease so much as about how you are taking care of it and how you are feeling."

The x-ray often reveals and localizes the pathological changes in the lungs when not detected by other means but it does not give us clinical activity of significance unless accompanied by symptoms. Its value then lies chiefly in negating tuberculosis when suspicious symptoms are present and also in furnishing valuable confirmatory evidence in the presence of symptoms. If we teach the practitioner that the early diagnosis of tuberculosis depends entirely upon physical signs and the x-ray too many physicians will be tempted to install equipment that may prove inferior in quality or unsatisfactory because expert skill and long practice are necessary before it can be used efficiently. Many a patient would be spared the sanatorium or the unhappy road to neurasthenia if this were more universally recognized.

What then are the symptoms, the clues that a patient gives when he presents himself that justify one in diagnosing active tuberculosis? The *family history* of consumption, especially where there has been a prolonged and intimate exposure, particularly in early life and to immediate relatives, nurses, nursemaids and attendants, or continuous exposure anywhere where debilitating conditions favor development of a former infection, is of paramount importance. It must be remembered also that the exposure may be to bovine or human sources.

Of the local symptoms *chest pains* may be early and troublesome. They are usually associated with pleurisy and may be either sharp and stabbing in character and also either constant or felt only during coughing. The pain is usually in the lower thoracic zone but may occur beneath the scapula or be referred to the apex. A typical pleurisy with effusion is considered presumptive evidence of tuberculosis and occurs mostly in the paranchymatous type. At the least, one-third of these cases subsequently develop pulmonary tuberculosis. A dry pleurisy is considered evidence of slight tuberculosis. In other words, pleurisy not following pneumonia but coming on insidiously should be treated as due to tuberculosis for a while at least.

A persistent *cough* lasting a month or longer with or without expectoration is very common in early pulmonary tuberculosis and requires investigation, although there is no cough characteristic of the disease and activity may exist

without it. In the early stages the cough is frequently dry and hacking and usually is bronchial in origin. In certain cases of bronchial gland tuberculosis there may be a brassy strident paroxysmal cough resembling that of pertussis.

*Sputum* is not necessarily present, but constant or occasional morning expectoration with or without cough should have attention. Absence of bacilli after one or several examinations is not proof against the presence of active disease. It means only that there is no bronchial ulceration. Sputum is comparatively rare in tuberculosis in childhood.

*Blood-spitting* even so much as a teaspoonful when raised from the lungs with or without sputum should be called tuberculosis until ruled out as caused by other conditions such as mitral stenosis. Blood streaks or spots may or may not mean tuberculosis. Hemoptysis in apparently young healthy persons has not infrequently been the first symptom of the disease. More often it occurs after considerable exertion or after failing health for a month or two. The bleeding of early pulmonary tuberculosis is usually slight but is likely to recur. Hemoptysis occurs about nine times as frequently in the parenchymatous as in the peribronchial type.

A slight *dyspnoea* on exertion may occur in early phthisis although it is usually associated with more extensive disease.

*Hoarseness* or a persistent *huskiness* needs attention. This is a rare symptom in childhood.

Of the general symptoms, *fever* is the most important initial one and in the early stage when tubercles are forming it is a constant symptom. In adults a slight but persistent rise in temperature over 99.4 degrees F. when taken by mouth for five minutes and at least four times daily over a period of a week is significant and should constitute *fever*. In very young children rectal temperature only is dependable. To have fever in a child, in a pathologic sense, there must be more or less constant elevation of temperature over 100 degrees taken at various times during the day and lasting over a period of at least a week. An occasional temperature of 99 should not be considered fever. And it must also be remembered that non-tuberculous focal infections and other toxic states can produce a fast pulse and elevation of temperature. Endocar-



ditis, hyperthyroidism, sinus infection, and pyorrhea alveolaris have been misleading. If due to tuberculosis the temperature and pulse usually are increased after exercise; they show a tendency to rise if the exercise is continued and they respond to rest. Rarely in the early stages is there a subnormal early morning temperature without an increase of more than a degree and a half during the twenty-four hours. A slight elevation of temperature when not associated with other symptoms and in the absence of physical signs loses considerable of its significance in the diagnosis of fresh tubercle.

A *pulse* should be considered abnormal when there is an increase of fifteen beats per minute above the average normal known pulse of a patient during various periods of the day, while at rest at home. An average pulse of 85 or over in men and 90 or over in women when at rest should be considered abnormal. Of special significance is a fast pulse associated with a subnormal temperature. In children a wider latitude of pulse should be allowed as this varies with the age. And observations should be over a longer period of time before it becomes a significant symptom.

An unexplained *loss of weight* of at least 5 per cent below normal during a period of time varying from four to six months is a common accompaniment of early active tuberculosis. In children, failure to gain weight for a period of four months or longer without definite cause is suspicious. Also a patient who develops pulmonary tuberculosis will often have a usual weight of ten pounds below the normal for his age and height.

*Loss of strength* or undue fatigue often accompanies this weight loss. Lack of staying power which is unusual for an individual child and cannot be satisfactorily explained is suggestive.

*Sweating* is present in a high percentage of the active cases and may occur early in the disease. These sweats generally take place during the night after the drop in temperature or in the day if the patient sleeps.

Migratory pains in the chest and shoulders, loss of color, digestive disorders, or the presence of tuberculosis elsewhere in the body such as in the glands, bones, joints, et cetera, should cause one to inquire into chest symptoms. A discharging ear coming on painlessly, fistula in ano, a

chronic epididymitis, are strongly suggestive of tuberculosis which should be looked for in the lungs.

In conclusion, when any one or more of the symptoms mentioned are present, a correct diagnosis can only be reached by means of common sense judgment after carefully considering the multiple minor signs and symptoms, both local and constitutional, which are frequently present and must be given their relative significance. In all cases in doubt especially in children when it is best to make a provisional diagnosis and give the patient the benefit of hygienic measures and prolonged observation although this does not necessarily mean that the patient be sent to a sanatorium or hospital or be definitely stamped as a consumptive.

J. H. Pratt and L. Brown, while serving on the Examining Board at Camp Devens during the late war, analyzed the records of 500 drafted men examined routinely for tuberculosis to obtain the incidence of symptoms. Besides the family history of consumption which 7.4 per cent gave, the percentage of cases showing symptoms were: (1) Cough lasting a month or more, 11.8 per cent; (2) Night sweats, 8.2 per cent; (3) Loss of weight for a period of six months, 7.4 per cent; (4) Pleurisy, 5.6 per cent; (5) Blood-spitting or blood streaked sputum at some time, 4.6 per cent. Thus by means of a simple questionnaire of subjective symptoms the men were sorted who would be expected to show objective signs. Of a series of cases with evidence of tuberculosis on physical examination about 78 per cent had one or more symptoms suggesting the disease. It would have been impossible to x-ray those hordes of men among whom infection was inevitable and universal but disease accidental. Those diseased had to be detected early and rapidly as the time allotted for examination was very limited and the weak could be held back and the strong sent overseas. The symptomatology held the key to this situation.

For several years to come we must not overlook the patient's history of having had influenza and his inability to gain strength since that time. We must also bear in mind in the diagnosing of the bugbear of cases the peribronchial type, that it is a good rule to look with suspicion upon cases in which the subject shows constitu-

tional depression and marked signs of ill health with only a small and apparently unimportant superficial lesion.

I have not discussed in detail the train of symptoms which many dwell upon as early manifestations of concealed or occult tuberculosis, such as low blood pressure, the so called neuro-circulatory asthenia, the effort syndrome, certain nervous manifestations, viscerosensory reflexes, amenorrhea, digestive disturbances etcetera, as these occur not only in early tuberculosis but in other diseases as well. When the cardinal symptoms or the symptoms per se are present they are valuable as confirmatory evidence—the finishing touches of an outlined picture.

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#### FURTHER NOTES RELATIVE TO ROENTGEN DIAGNOSIS OF TUBERCULOSIS\*

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It is not the writers purpose at this time to attempt any new observations relative to the diagnosis of tuberculosis, but rather to assemble and emphasize those which experience has proven of value; and to try to remove certain false conceptions which seem to prevail in the medical mind upon this important subject.

During the past eight years the writer has studied, with an open mind, several thousand stereo-roentgenograms of lungs in which tuberculous infection was suspected. And the conviction has developed the strength of a certainty that definite objective signs of the disease are to be found in every case of clinical tuberculosis. The correct interpretation of these signs, however, is possible only after extensive experience, and however experienced one may be he is never entirely free from the danger of error. In other words, it may be said that the x-ray diagnosis of pulmonary tuberculosis must still be regarded as an art rather than a science. If this is true, the corollary statement that the roentgen diagnosis must be checked and supplemented by as much clinical evidence in the case as can be assembled, must also be accepted. Nevertheless, if we appraise the x-ray method by the same

standards that apply to other clinical methods it is unquestionably the most important.

The negative diagnosis, when made in the absence of all signs of lung disease, should outweigh all other clinical evidence however conclusive it may seem to be. When signs, more or less characteristic of pulmonary tuberculosis are present in the stereo-roentgenogram and a positive diagnosis of tuberculosis is based thereon, the latter should be accepted merely as presumptive proof of the disease to be ruled out if possible by more careful clinical observations.

The writer confesses that he has in certain other communications attempted to show that there are certain pathognomonic roentgen signs of pulmonary tuberculosis. There was much clinical support for such a claim and much statistical evidence was found to support it. In the light of accumulated experience, however, the writer believes it safe to say there are no roentgen signs of tuberculosis sufficiently characteristic to be called infallible. Those signs which we have come to regard as most characteristic of active tuberculosis are probably due to lymphatic engorgement or active congestion in the parenchyma of the lungs, and these changes are, of course, to be found in other chronic conditions. There remains the somewhat typical distribution of these changes which tend to give the lung shadows a cone-shaped formation with apex toward the hilus. But this formation has been found to prevail in a very typical manner in the roentgenograms of granite workers, suffering with a certain type of pneumoconiosis. In character, they are not unlike the patches of bronchopneumonia observed in the influenza epidemic of 1918, but they tend more to assume the characteristic cone-shape, with base toward the pleura and are usually less dense. There is often a tendency for these changes to gradually disappear as the disease in this area becomes more and more quiescent; and one may thus observe every gradation from the bronchopneumonia-like patch to a clear and normal appearing lung area, with perhaps a few discrete sharply defined shadows remaining. The writer regards it unsafe to make a negative diagnosis as to the presence of pulmonary tuberculosis while these peripheral shadows, even though atypical, are present in the upper part of one or both lung fields. On the other hand, hilus thickening and

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peribronchial infiltration seem to be caused more frequently by focal infection, dust inhalation, or other bronchial irritants.

It is extremely doubtful whether the roentgen diagnosis of peribronchial or hilus tuberculosis in the adult is ever justified. If this disease ever manifests itself purely in these forms, which the writer has much reason to doubt, it has no characteristics here which serve to differentiate it from the more common streptococcus invasions. In early childhood tuberculosis is the most common cause of enlarged hilus glands, but even here a diagnosis based upon this evidence requires the additional support of clinical history and the Von Priquet reaction.

The common appearance resulting from the milder forms of gas poisoning is a diffuse mottling of the lung fields limited to the distribution of the bronchial tree. The more gross changes due to mixed infection which are usually present in the moderately advanced cases of pulmonary tuberculosis may so cover up and mask the tuberculous lesion that the roentgen diagnosis is made more difficult. Yet a careful study of every part of the roentgenogram in such a case will almost invariably reveal some area in which the tuberculous changes are typical. Thus, while it is doubtless true that there are some cases in which a positive roentgen diagnosis may be made, even in the absence of clinical evidence, the possibility of error should be constantly borne in mind and emphasis placed upon the importance of correlating all available data as a practical routine procedure. Even the most typical roentgen signs of tuberculosis may be so closely simulated by other lesions that they must be interpreted in the light of case history, physical findings and laboratory observations. We no longer demand that the laboratory pathologist shall be able to deduce from the unaided examination of a piece of tissue all of the case history of the patient from whom it was removed. And time has come to place roentgen diagnosis in its proper place among the important diagnostic measures, none of which should be accepted alone as infallible.

The epidemic of streptococcus pneumonia offered an unusual opportunity to study the acute lesions of this type of infection and the residual changes persisting for months and even years after recovery from the acute attack are similar

to the changes previously described by the writer and attributed to chronic pulmonary streptococciosis. Likewise the writer's contention that the presence of such lesions renders the recognition of the early tuberculous changes much more difficult, either by masking or simulating them, has been abundantly supported by the more recent experience of others.

Much has been said during the past year or two about diffuse infiltration of syphilis, as distinguished from gumma. The changes are said to closely simulate tuberculosis. In 1915 the writer mentioned this possibility since some of these shadows certainly disappeared under antiluetic treatment. However, all such discussions must continue to lack force until the spirochete has been proven to be active in the lung without producing gumma.

If we confine our differential diagnosis to those conditions which often produce demonstrable changes in the upper lung fields, one basic observation is worthy of note i. e., the early changes of tuberculosis are characterized by low density values requiring not only an excellent quality of stereogram, but the most careful study for their demonstration. Other infections, pneumoconiosis and malignant metastases tend to produce more gross and massive changes while the dissemination is usually more widespread. As a broad working rule, therefore, it may be said that the more film or veil-like the shadows observed the more the probability of tuberculosis. It must also be borne in mind that tuberculosis tends to unilateral distribution while other chronic lesions from which differentiation must be made are all more likely to be bilateral. Add to this characteristic the distribution of radiographic changes in the lung periphery, beyond the extension of the finer bronchioles, especially in the first and second interspaces or in the apex of the lower lobe, with the formation of one or two cones; and the evidence is about all in for the differential diagnosis of early pulmonary tuberculosis.

Advanced pulmonary tuberculosis is sometimes more difficult to differentiate than early forms because here, the changes being more gross, more closely simulate those of other diseases like pneumoconiosis. Here too we have the mixed infections which cover up and mask the more characteristic early manifestations. In

the advanced forms however, we are protected from error by the more marked clinical manifestations and by the fact that we can usually find some field of lesser involvement where the changes are more typical.

It cannot be too strongly emphasized that an early roentgen diagnosis of pulmonary tuberculosis depends above all upon stereograms of high quality. The most experienced diagnostician cannot read poor plates, and if the best cannot be obtained, the method must be relegated to a position of secondary importance. It seems necessary to stress this point because one so often sees a negative or positive diagnosis based upon a so called interpretation of plates so lacking in detail that the slight changes due to early pulmonary tuberculosis would surely not appear even though the disease were present.

Fluoroscopy is far more limited in its application to the diagnosis of this disease. Surely one cannot hope to differentiate by the fluoroscope the various chronic lesions which decrease the air volume in a given part of the lung and thereby increase the relative density thereof. And it is equally certain that the earlier changes will usually escape detection upon the fluoroscopic screen.

One field of unquestionable usefulness in which the roentgenographic study has no competitor is that of practical classification. Both prognosis and treatment are almost wholly dependent upon an accurate determination of the extent of involvement, presence or absence of cavitation, amount of fibrosis and degree of chronicity. In such a classification the roentgenogram knows no peer and were it proven valueless in all other respects, this fact alone would demand its assistance in all known cases of pulmonary tuberculosis.

## SPASMODIC STENOSIS OF THE ESOPHAGUS\*

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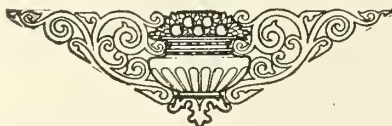
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In recent years there has been a great deal of interest manifested in diseases of the esophagus. This is due to the development of more accurate methods of study, for there had been very little advance made in the diagnosis of these diseases until the x-ray and endoscopic methods of study were introduced. Until this time there had been very few references made to spasmodic disease of the esophagus but, with these more accurate methods of study, we find that spasmodic stenosis of the esophagus is mentioned quite frequently.

The factor of spasm enters into nearly every condition of the esophagus. Any one who has done endoscopic work realizes the frequency with which spasm occurs in the presence of foreign bodies in the esophagus and also in many of the organic diseases. Clinically, we may classify spasmodic stenosis into spasms of the upper and spasms of the lower end of the esophagus. Rarely do we see a spasm in the middle third and only when it is associated with some organic disease. However, this classification into high and low spasm will not always hold good as both may be present at the same time.

In 1882, Mikuliez attributed idiopathic dilatation of the esophagus to cardiospasm and in 1888 this view was corroborated by Metzler. That cardiospasm was the etiological factor in idiopathic dilatation of the esophagus was not generally accepted at this time and it was attributed to many rather indefinitely understood causes. Rosenheim thought the condition due to primary atony of the muscular coats of the esophagus. Kraus maintained that the condition was due to long continued spasm of the cardia associated with a paralysis of the circular fibers of the esophagus, which in turn were due to degenerative changes in the vagi. Martin considered acute esophagitis an important factor. Zenker, Fleiner and others maintained that dilatation resulted from a congenital predisposition on the part of the esophagus. Kinking at the



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hiatus esophagi has been advanced as a factor. Hertz believes the condition is due to a lack of normal relaxation of the cardia, for if it were due to spasm one would find more hypertrophy of the cardia than is demonstrated on examination. Plummer, in his study of forty cases reported in 1908, definitely proved that the spasm precedes the dilatation and that primary atony is relatively a rare condition. This conclusion, he states, is further born out by the evidence of muscular hypertrophy. Smithies states that "it is quite likely, that such lesions as give rise to repeated spasms at the cardia are capable of producing muscular hypertrophy of an over-active and over-worked sphincter, and at the same time this alteration in sphincter reflex secondarily disturbs the neuro-muscular mechanism of the esophagus above it." Jackson believes that so-called "cardiospasm" is in reality, in almost all instances, a hiatal esophagism or phrenospasm. At first this opinion was based on endoscopic clinical observation. An anatomical basis for this view has been furnished by Leibult and Rouget, working independently of each other. They have demonstrated muscular fibers, leaving each crus at the level of the hiatus, which pass to the esophagus and with whose fibers they are interlaced, terminating on the anterior aspect. These fibers exist only on the subdiaphragmatic portion of the esophagus and interlace with those of the opposite side. Jackson would abolish the old term of cardiospasm and substitute therefore the clinical types of spasm that may be found. These are namely, hiatal, abdominal and cardial esophagisms.

It is interesting to note that clinically we only see chronic spasm at the upper or lower end of the esophagus. At the upper end, the inferior constrictor of the pharynx spreads out on the lateral and anterior surfaces of the esophagus. At the lower end, the esophagus passes through the diaphragm, surrounded on either side by the cruri which are believed by Leibult and Rouget to give off fibers which surround and interlace with those of the esophagus. If spasm is due entirely to the contraction of the esophageal musculature one would think that chronic spasm would occur at any point along the esophagus. This, in my experience, has not been true. My observations, based on endoscopic studies, confirm the view held by Jackson in regard to the

following: Chronic spasm occurs either at the upper or lower end of the esophagus, occasionally occurring at both ends of the esophagus; the spasm occurring at the upper end of the esophagus is, in fact, a spasm of the inferior constrictor of the pharynx; the spasm at the lower end of the esophagus is primarily a spasm of the hiatal esophagus; abdominal and cardial esophagisms occur only in association with hiatal esophagisms.

The only difficulty experienced in passing the esophagoscope occurs at the hiatus esophagi. Once this point is passed the instrument passes through the abdominal esophagus and cardia without difficulty. Furthermore, the esophagoscope can usually be passed into the stomach in all cases except those in which there is an "S" shaped esophagus with marked kinking.

It is not my desire to go into a detailed discussion of the act of swallowing, as it is well known that the greater part of the act of swallowing is due to a complicated reflex. It is only the beginning of the swallowing act that is under voluntary control. Once the bolus of food is started down the esophagus, its further progress is due to reflex peristalsis. Each portion of the esophagus is dilated as the bolus of food enters, which in turn stimulates a peristaltic contraction wave which carries the food down the esophagus and into the stomach. Granting that spasmodic stenosis is a pathological disturbance of a normal reflex, it becomes very interesting to study the causes which may be the disturbing factors. In some cases it seems possible that careless, rapid eating or the gulping of food is sufficient to produce the initial spasm, as many patients state that the first abnormal sensation, referred to the region of the esophagus, occurred while hurriedly taking food. Clinically, we know that spasmodic stenosis may occur in any local disease of the esophagus or be associated with diseases that are quite remote from the esophagus. From endoscopic studies, it has been demonstrated that severe spasm of the esophagus may occur occasionally, associated with superficial lesions of the mucous membrane. Jackson states that this is probably due to the fact that the esophageal pain-sense is less efficient than the esophageal tactile sense. However, it is well established that the esophagus is quite insensitive below the cricoid level.

Foreign bodies lodged in the esophagus and non-malignant organic strictures are patent factors in producing spasmodic stenosis. On the other hand, rarely do we see any marked degree of spasm associated with carcinoma. This lack of spasm is due to the cancerous infiltration of the deeper tissues of the esophagus which prevents contraction of the circular fibers. In some cases, diseases of any of the abdominal viscera may give rise to spasmodic stenosis of the esophagus without any local cause being found in the esophagus itself. Thus, the reflex stimulus may arise from the stomach, duodenum, gallbladder, appendix or other abdominal viscera. In other cases the exciting factor may be found in some form of focal infection, such as infected teeth, tonsils or sinuses. Still, in other cases, the initial spasm would appear to be due to some emotional or psychic condition. However, it must be borne in mind that spasmodic stenosis frequently can not be explained on this basis.

When spasmodic stenosis occurs not associated with local disease of the esophagus, it practically always occurs at the upper or lower end of the tube. May this not in a measure be explained by the difference in anatomical structure of the esophagus at these points? In the normal individual, there is a hesitation in the swallowing act when the food reaches the hiatal esophagus. In spasmodic disease of the lower end of the esophagus this is prolonged. Thus, primarily the spasm may be considered a pathological prolongation of a normal reflex.

There is some difference of opinion as to whether or not hypertrophy of the lower end of the esophagus occurs in spasmodic stenosis. In my cases which have been operated upon or have come to autopsy, no hypertrophy could be demonstrated. Granting that marked hypertrophy is the rule, it is rather difficult to understand the relief from symptoms that occurs when the spasm is dilated with only a pressure of 50 to 150 millimeters of mercury and it is just as difficult to understand a cardiac sphincter hypertrophied sufficiently to withstand a pressure of 500 to 650 millimeters of mercury without rupture when, under normal conditions, there is no increase of circular fibers at the cardia. In my opinion, the greater portion of the pressure is borne by the cruri of the diaphragm.

In the beginning of the disease, the symptoms

are usually intermittent in character. They may be mild or very severe. In spasm of the upper end of the esophagus the most characteristic symptom is difficulty in swallowing, which is due to inability to start the food downward. Once the start is made, the food passes through the esophagus into the stomach without further difficulty. In mild spasms of the lower end of the esophagus there occurs muscular hypertrophy of the esophageal wall, which is later followed by atony and dilatation. If the spasm is severe, there is little hypertrophy but rapid dilatation. The initial spasm is usually ushered in while the patient is hurriedly taking food. There is seldom severe pain but these patients complain of a fullness or pressure beneath the lower end of the sternum. Sometimes the sensation is felt in the upper part or the middle of the chest. They feel as if the food sticks and they realize that it will not go down. It feels as if the passage is closed and the food fills up the chest. This sensation of fullness increases in *pari passu* with the dilatation of the esophagus. Salivation is a frequent symptom. Frequently the patient voluntarily relieves the discomfort in a few minutes after finishing a meal by bringing up the greater part of what he has eaten, mixed with mucus and saliva. This generally can be done quite easily but occasionally it is necessary to produce a vomiting reflex by tickling the throat. It is uncommon for the food to be returned quite involuntarily but this may occur if a large quantity has been retained in a greatly dilated esophagus sufficiently long for a certain amount of bacterial decomposition to occur. In these cases, the esophagus becomes very much irritated which causes its contents to be rejected. The vomiting or regurgitation in these cases is very characteristic. It is usually sudden, without nausea, propulsive in character and frequently occurs during the meal or just after the patient has finished taking food. Occasionally, it is definitely delayed and the vomiting occurs in the early morning when no food has been taken since the evening before. Rarely, food may be vomited that has been eaten twenty-four hours previously. The vomitus consists of the food eaten, mixed with a large amount of mucus and saliva. It is alkaline in reaction and, in the long standing cases with marked dilatation, shows a high bacterial count.



Semi-solid foods are usually less difficult to swallow than either liquids or solids. All are retained better if swallowed extremely slowly. In the dilatation of the esophagus due to spasm the weight of the food after a meal forces the more liquid portion slowly into the stomach. Gravity is also a factor in these cases. Some patients have learned to add to the weight and bulk of the food by drinking one or more glasses of water. They follow this by voluntary acts of swallowing which definitely increases the pressure in the esophagus and this consequently forces more food into the stomach. When the weight of the column of food falls below a certain point in the individual case or the patient lies down, the pressure becomes insufficient and the flow ceases. Consequently, in many cases the esophagus continually contains food. The horizontal position of the body during sleep lessens the pressure in the esophagus and permits the esophageal contents to flow back into the pharynx. When this occurs, some of the food or secretion frequently finds its way into the trachea and these patients are awakened with severe paroxysm of coughing and sometimes with symptoms of strangulation. The general health at first is not impaired. This is in complete contrast to malignant disease of the esophagus and in spite of the fact that these patients may lose considerable weight. In many cases of mild degree the general appearance of the patient remains good for many years but in the more severe types of the disease the atony and dilatation increases until the patient's nutrition is markedly impaired. Then we have added to the symptoms already mentioned those due to inanition.

In spasmodic disease of the upper end of the esophagus, the clinical history aids materially in the diagnosis but a positive diagnosis can only be made by an endoscopic study. In no other way is it possible to differentiate between spasmodic stenosis and that due to organic disease. The endoscopic appearances of spasm will be discussed later. When the disease occurs at the lower end of the esophagus and is well established, the patient's description of his symptoms is generally so characteristic that a diagnosis of spasm with dilatation of the esophagus may frequently be made from the clinical history with a considerable degree of probability. In the early cases, however, the history is not so charac-

teristic and points only to some form of obstruction, the character of which must be determined by further study.

The following special methods of examination are helpful in all cases: first, the sounding of the esophagus with an ordinary stomach tube or an olive bougie; second an x-ray study; third, an endoscopic examination. In these cases, when a stomach tube is introduced into the esophagus it passes freely until the hiatal esophagus is reached—here its further progress is stopped, due to the spasmodic contraction of the esophagus at this point. If there is much dilatation of the esophagus the tube frequently curls on itself and gives one the impression that it has entered the stomach. In the cases with marked dilatation, the manipulation of the tube usually causes free regurgitation of esophageal contents. In the early cases, with very little dilatation, the stomach tube occasionally may be passed into the stomach. If, after failing to pass a stomach tube, one is successful in passing a large olive bougie using a silk thread as a guide, it should suggest at once that the lesion is a spasmodic and not an organic stenosis. The sounding of the esophagus with the unguided olive bougie is not free from danger and should not be done. This is especially true in the cases with marked dilatation. In these cases it not infrequently happens that there is some pouching of the lower end of the esophagus to the right and above the diaphragm. The unguided bougie is more likely to enter this pouch than the hiatal esophagus and, if any degree of force is used in its manipulation, puncture of the esophagus may occur. In sounding the esophagus in spasmodic stenosis of the lower end, one is impressed with the wide variation in the amount of resistance encountered but at all times some resistance is apparent.

The roentgen examination in spasmodic stenosis of the lower end of the esophagus usually establishes the diagnosis. However, in early cases with very little dilatation of the esophagus one should not depend too much on this method. These are the cases in which a careful endoscopic examination is most helpful. Early in the disease it is most important that the examination be made during the attack. In the early stage the contrast between the apparently normal esophagus seen with x-ray when an examination

is made in the interval *between* the attacks and that seen *during* the attack is characteristic of spasmodic disease, as very little variation occurs in organic stenosis. The esophagus should be thoroughly washed out before the barium mixture is given, otherwise it will frequently be found partially filled with food and secretion which may cause irregularity in outline that is difficult to differentiate from organic disease. In the examination, one should make both a fluoroscopic and radiographic study with the patient in the anterior-posterior and oblique positions. These two positions bring out details that otherwise might be overlooked. In the typical case one finds a blunt or conical obstruction at the hiatus esophagi with a secondary dilatation of the esophagus. The dilatation is uniform and as a rule there is no irregularity in outline. In long standing cases there may be lengthening of the esophagus as well as dilatation with pouching of the lower end—the so-called “S” shaped esophagus. In some of these cases the capacity of the esophagus may be a thousand cubic centimeters or more. In the cases with moderate dilatation the barium meal passes into the stomach in a comparatively short time but when marked dilatation is present the barium ceases to flow into the stomach when the intra-esophageal pressure falls below a certain point in the individual case. If the patient does not vomit, barium may be found in the esophagus twenty-four hours after the examination. Two conditions confuse the diagnosis. They are carcinoma and cicatricial stenosis. In neither one are you likely to find the lesion limited to the hiatus esophagi. They both, as a rule, cause irregularity in outline which extends along the esophagus above the diaphragmatic opening. However, it must not be forgotten that a regular contour is sometimes found in carcinoma and also that irregularities occur in spasm.

Esophagoscopy adds much to our knowledge in spasmodic disease of the esophagus. I believe that, in spasm of the upper end and early in spasm of the lower end, it offers more than any other method of study. By other methods it is very difficult to make a differential diagnosis between spasmodic and organic stenosis of the upper end of the esophagus. An endoscopic study permits direct inspection of the diseased area which usually establishes the diagnosis.

Also, early in obstructive lesions of the lower end of the esophagus, direct endoscopic examination gives valuable information as to whether or not the obstruction is due to spasm or organic disease. By this method one can actually see the spasmodic closure and carefully examine the mucosal surface for an abrasion, ulceration or other evidence of organic disease. Esophagoscopy, if carefully done, is not dangerous and causes the patient very little discomfort. A local anesthetic applied to the pharynx and upper end of the esophagus is all that is necessary in many cases as the esophagus is insensitive below the cricoid level. Most of the cases with marked dilatation do not even require a local anesthetic.

Some cases of spasmodic stenosis occurring at the upper end of the esophagus cannot be endoscopically differentiated from the spasm that always occurs upon introducing the esophagoscope. In other instances, the mucosa is apparently thrown into folds which radiate from a central point and in a few cases the entrance into the esophagus appears as a transverse or crescent-like slit. The mucous membrane is normal in appearance.

By far the most important endoscopic finding is that, when slight pressure is made with the esophagoscope, the spasm relaxes and no further difficulty is experienced in passing the instrument through the esophagus.

In cases of spasmodic stenosis occurring at the lower end of the esophagus no difficulty is experienced in introducing the esophagoscope until it reaches the hiatus esophagi. There it meets definite resistance, but with gentle pressure the spasm relaxes and the esophagoscope passes into the stomach. Early in the disease the endoscopic appearance of the esophagus may not differ from the normal. Late in the disease the esophagus is very much dilated, the walls are atonic, the mucosal folds obliterated, the respiratory movements absent, the mucous membrane is of grayish color, showing evidence of chronic inflammation and, in many cases, superficial ulcerations.

The treatment of spasmodic stenosis of the esophagus is determined by several factors, namely: the location of the spasm, the stage of the disease and the appearance of the esophagus on examination. In the cases that come under



observation early in the disease one may expect good results from treatment, while in those cases that come under observation when the disease is far advanced one finds the results less satisfactory. It is obvious that the exciting cause, if found, should be removed. In many cases, the spasm ceases and the symptoms disappear without further treatment. These patients are frequently undernourished, due to dysphagia. Therefore, the diet should be one of high caloric value from which all highly seasoned, coarse and irritating foods have been removed. These patients should be advised to eat their meals very slowly. This especially applies to the cases seen early in the disease as, not infrequently, the history suggests that the initial spasm may have been caused by the rapid gulping of food. In the cases in which there is marked dilatation of the esophagus soft or semi-solid food should be given the preference, as it usually causes less dysphagia. If possible, the esophagus should be lavaged at night in all cases in which food and secretion are found to be present continuously. By doing this many of the annoying symptoms occurring during sleep and due to the presence of food in the esophagus, are relieved. Also by removing the contents of the esophagus the intra-esophageal pressure is lessened and this may aid the musculature in regaining some of its lost tone.

Medicinal treatment, while limited to a few drugs, is helpful in many cases. Belladonna, given in increasing dosage until one reaches the physiological tolerance of the drug, is valuable in most of the early cases and in some of the late ones. Bromides are useful in the definitely neurotic patient. Mineral Oil, by protecting the mucosa, allays irritation and is especially useful when the spasm is associated with a local lesion of the mucosa.

When the spasm is well established or is associated with marked dilatation of the esophagus some form of mechanical stretching of the spasmodic area is necessary before one may expect to relieve or cure the disease. Spasmodic stenosis occurring at the upper end of the esophagus is very much easier to treat than that occurring at the lower end. The former is usually relieved by the introduction of the large-sized esophagoscope. In the severe cases from four to six treatments may be required. The passage of a large-

sized esophageal bougie will accomplish the same result. In spasmodic disease of the lower end of the esophagus the passage of the large esophagoscope or large bougies does not cause enough dilatation to overcome the spasm and in these cases it is necessary to use some other means of dilatation. The methods most frequently employed are divulsion with a specially constructed steel divulsor or dilatation with a hydrostatic or pneumatic bag.

Russell's work, followed by that of Lerche, Sippey and Plummer demonstrated that spasmodic stenosis of the lower end of the esophagus could be treated successfully by dilatation with a specially constructed hydrostatic dilator introduced through the esophagus. In our work, for a number of years, we used the water distended dilator devised by Plummer. For some time we have been dilating the spasm under fluoroscopic control, using the Plummer instrument but substituting air inflation for water distention. The advantage of the air distended apparatus is that it lends itself to x-ray visualization as a means of control—an aid we believe is most helpful. In order to better visualize the apparatus we have a thick barium paste applied to the outer surface of the silk bag. This has added much to our fluoroscopic image. The x-ray shows that in some cases it is difficult to place the instrument properly and that in these cases the tendency is for the instrument to either slip upward or, more frequently, downward at the moment of distention.

In some cases we have found that the easiest way to place the bag is to pass it beyond the spasm, slightly inflate, and then withdraw it until properly placed and, while holding it in position, proceed with the inflation. The x-ray also shows that the usual dilator is of greater diameter than is necessary—the spasmodic area never being stretched to the full extent of the dilator.

The method of treatment is as follows: The instrument is introduced by using a silk thread as a guide. The patient is placed before the fluoroscope and the exact placing of the bag done under fluoroscopic control. Inflation is begun. The manner and rapidity with which dilatation occurs is carefully noted. At short intervals a reading of the manometer is taken. The degree of dilatation is also carefully noted

and usually not continued beyond 4 to 5 centimeters in diameter. If pain occurs, the pressure is promptly released. At each treatment the distended bag is left in position from five to ten minutes. The number of treatments have varied in the mild cases from two to three, with a pressure of 100 to 200 millimeters of mercury. In the more severe ones it has been necessary to give from six to ten treatments, with a pressure varying from 200 to 450 millimeters of mercury.

The first few treatments are repeated every fourth day. If more treatments are required, the time between the same is lengthened to a week or even two weeks. The last few treatments are given at monthly intervals. The patient should not be discharged until the esophagus is found to be free from food.

The method of forceful divulsion with an inflexible steel instrument has never appealed to me. Each treatment requires a general anesthetic and the placing of the divulsor endoscopically. Both of these requirements increase the risk to the patient.

The result of these studies are based on the observation and treatment of fifty cases. In the cases of spasm of the upper end of the esophagus the diagnosis was confirmed by an endoscopic study, while in the cases of spasm of the lower end of the esophagus the diagnosis was confirmed by both an x-ray and esophagoscopy examination.

The relief from symptoms usually occurred very promptly. Not infrequently the patient was able to eat an ordinary meal after the first satisfactory dilatation. The gain in weight and strength was rapid. The cases of spasm of the upper end have been relieved completely, while the results in spasm of the lower end depended mostly on the degree of associated dilatation. The early cases with a moderate degree of dilatation were relieved completely. The late cases, with enormous dilatation, were markedly improved. How much the esophagus regained its muscular tone depended on the degree of dilatation. In the early cases with moderate dilatation the esophagus apparently regained most of its lost tone but in the cases with enormous dilatation no change in the size of the esophagus was noted. No cases of marked lengthening of the esophagus with pouching to the right and above the diaphragm—the so-called "S" shaped

esophagus—occurred in this series. The dilatation of the lower end of the esophagus were made by using either a water distended or an air inflated apparatus. From our studies, we believe that the apparatus may be more accurately placed and the degree of dilatation more carefully observed if the dilatations are made with an air inflated apparatus under fluoroscopic control.

#### DISCUSSION

DR. P. P. VINSON, Rochester: I want to discuss just three points in the diagnosis of cardiospasm. First, the condition is not seen necessarily in neurotic persons; the majority of our cases have not been more neurotic than the general run of patients. Second, a diagnosis cannot be made from the roentgenographic evidence, for the reason that cases of obscure carcinoma of the cardia may simulate absolutely the findings of cardiospasm. There may be diffuse dilatation of the esophagus such as is seen in the moderate dilatations due to cardiospasm, and only by passing an olive bougie through the cardia can this lesion be eliminated. The history is of much value but is not conclusive. The symptoms may be of long duration. Even with two or three years of carcinoma at the cardia there may be a perfectly smooth cigar-tip type of cardia with no filling defect, and expert roentgenologists cannot distinguish this condition from cardiospasm. Third, we should all be on the lookout for cardiospasm in patients who complain of epigastric pain.

In a recent review of 300 cases of cardiospasm at the Mayo Clinic we found that 142 patients complained of epigastric pain. Of this number fifty-two had pain as the initial symptom with or without dysphagia, and one patient had attacks of pain extending over a period of fourteen years before dysphagia began.

We see quite a large number of cases of cardiospasm with epigastric pain that simulate gall bladder disease, or they may simulate coronary sclerosis with agina pectoris. These three conditions are at times certainly very difficult to differentiate. Seventy-seven of the 142 patients gave pain as one of the chief symptoms. The pain may be mild, or it may be severe. We have had a number of cases of cardiospasm with only slight lagging of the indigested meal at the cardia, in which there were repeated attacks of epigastric pain simulating gall bladder colic, occurring however more frequently, probably three of four times a day without jaundice, without soreness, and without definite radiation. These cases have been frequently diagnosed as gall bladder disease, but the patients have been relieved absolutely of their symptoms by dilatation of the cardia.

I am inclined to class spasms high in the esophagus among the hysterical dysphagias in which the patients are relieved regardless of the size of the olive passed into the esophagus. Cardiospasm is relieved



only by wide dilatation of the cardia, and it is our experience contrary to that of Dr. Freeman, that this stretching is more effectual in the long standing cases, than in cases in which the history is short and the dilatation of the esophagus is slight. In the early cases the dilatation must not be carried so far as in the more advanced cases, and the results are not so good. We usually dilate once. I believe our statistics will show about 65 or 70 per cent cures with one dilatation.

DR. ROBERT RIZER, Minneapolis: I was not fortunate enough to hear all of Dr. Freeman's paper as I came in a little late. However, I got an idea of what he said from the remarks made by Dr. Vinson.

I think one of the most important factors is diagnosis, and I feel strongly that the diagnosis cannot be made on the x-ray findings alone, as pointed out by Dr. Vinson. I think the endoscopic examination is another most important factor, particularly early in the diagnostic period. In many instances it will not be possible to get down into the esophagus. In the experience of so many men where there is a good deal of sacculatation at the base of the esophagus, passing a string and going down over the string with the esophagoscope, or passing a tube is difficult. A soft esophageal bougie should not be used as one cannot tell from the early symptoms the degree of inflammation which may be present. Rupture of the esophagus is easily produced, and unless great care is used early a soft rubber tube should be used in the dilatations.

I agree with Dr. Vinson that quite a percentage of cures have been obtained in the early and later stages where there is a great deal of sacculatation. Dilatation may be necessary in a number of cases because of the amount of inflammation present and the reflex spasm.

Another thing which should be done in regard to irritating fluid is the elimination of cold. A drink of cold water will produce cardiospasm. If one wants to demonstrate cardiospasm, the only thing to do is to give the patient a drink of cold water, putting in some methylene blue or some other colored solution into the stomach, and then have the patient drink the water and later withdrawing the colored solution.

I think great care should be used in dilating. The manometer should be used. We have used a high pressure machine with a screen, the type that contains a small olive at the end, so that if it is necessary to go over the string it can be done with ease. To that extent there is no danger.

It has been shown experimentally and in human beings that where rupture has occurred, naturally it carries a high mortality.

I was much pleased with Dr. Vinson's report of cases. His experience is practically identical with the experience we have had and the cases we have reviewed.

DR. FRANK SMITHIES, Chicago, Illinois: It is a very interesting fact that the average textbook merely mentions the type of ailment which is under consideration, although cardiospasm with diffuse dilata-

tion of the esophagus is a most distressing cause of chronic dysphagia. Cardiospasm with diffuse dilatation of the esophagus is of more frequent incidence than is cancer of the esophagus; it is more frequent than is stenosis in the esophagus as the result of peptic ulcer, and its manifestations are quite as annoying, quite as distressing to an individual as are any of the diseases mentioned.

I dislike very much the term "spasmodic stenosis" of the esophagus. It seems to imply that we are dealing with a temporary thing, with something which is exclusively in the nature of a neurosis or a reflex. I may have been rather unfortunate in my experience, but certainly I see very few of these cases of "spasmodic stenosis" of the esophagus which are so early as to be but temporary, transient or which are not accompanied by definite alterations of an anatomic nature in the esophagus itself.

The cases which come under my observation of pure "spasmodic stenosis" of the esophagus are regarded as roughly due to local inflammation, or perhaps to a hysteroid condition, (as has been mentioned) they are not sufficiently serious to warrant much concern. On the other hand, the cases which come to us in the group of so-called "cardiospasm" are individuals usually who are seriously ill, who are starving to death, and who do die undoubtedly unless they are adequately relieved. I am of the opinion that a considerable number of the deaths from "cancer of the esophagus", as given in the death certificates,—instances where no autopsy has been held—are real deaths from cancer of the esophagus, but are examples of starvation from intractable and untreated cardiospasm.

The term "cardiospasm" is itself an unfortunate one. We prefer to employ the term "Meltzer's syndrome," because Meltzer really described this condition many years ago, this syndrome includes not only a definite anatomic change at the cardia and in the lower esophagus, but a change very likely in the entire extent of the esophagus possibly of a neuromuscular nature.

This is not a malfunction which is relieved by bromids, by benzol benzoate, or by frequently washing out the esophagus; it requires active treatment. If the condition is recognized, and unfortunately it is not usually recognized in general practice, the treatment is simple, reasonably safe and highly satisfactory. In fact, the treatment is more satisfactory than with any other form of chronic esophageal stenosis with which I am familiar, perhaps excepting syphilis.

The lesions as they come to us are definitely obstructive. I see very few instances of true cardiospasm where I can pass a stomach tube or an esophagoscope or anything of that kind into the stomach even when such are guided by silk cord or wire. The cases as they come to me have had an average esophageal permanent retention of more than 200 c. c. In one instance, we had 2800 c. c. retained in the esophagus for a number of months, the right lower border

of the esophageal sac being four inches below the cardia. Such cases demand treatment for an anatomic defect. Certainly, we owe a debt of gratitude to Dr. H. Plummer of Rochester, Minn., for calling our attention to this condition years ago and suggesting a most admirable form of treatment. We have used Plummer's method of treatment in a considerable number of cases, certainly in enough to warrant an opinion, and we find there is nothing superior to it, provided it is properly employed and controlled.

We have not found that cardiospasm patients are pain-free. With respect prognosis as has been mentioned by Dr. Vinson, most of them are benefited. When treating them we rather like to have them experience a bit of pain by the instrumentation rather than the thing being easily borne; pain supplies a rough gauge of the degree of dilatation. There is, however, a mortality of about 3 per cent from treatment, taking cases as they come, in a considerable series. It is sometimes difficult to say whether or not one has ruptured the esophagus. We have one instance where a bougie had been passed at another institution for many months, and because the tip of the olive passed more than four inches deeper than it should go in the normal esophagus it was presumed by the operator that the tip had gone into the stomach. I was the one unfortunately who dilated this patient later, by hydrostatic divulsion. He experienced a sudden collapse about one hour after the dilatation upon the drinking of cold water. My assistant suggested that we might be dealing with an instance of spontaneous pneumothorax from an old tuberculosis, but I was not convinced. I punctured the pleural sac on one side, and recovered some muddy colored fluid. I then had the patient take a small capsule of carmine (gr. iii) and in a few minutes punctured the pleural sac again, and recovered red stained fluid. That convinced me we did not have a spontaneous pneumothorax; at autopsy it was shown that we had split the lower end of the esophagus through the cardia upwards.

Dr. Freeman mentioned that in his experience, patients do not have hypertrophy at the cardiac sphincter. I think that this has been stated before by others. However, in my experience at autopsy, and we have had several, there has been a definite hypertrophy not only of the sphincter but in the lower end of the esophagus in the cases where the dilatation of the lower esophagus has not produced marked attenuation of the muscle bundles. I think the only reason that we can get successful results in the treatment of late cases is because we have a definitely hypertrophied sphincter to divulse.

With other points which have been brought up in the discussion and in Dr. Freeman's paper I heartily agree. Certainly, the roentgen ray does not always tell the story; but it gives more than a hint. The roentgen examination should be carried on as routine, however. Endoscopic examination is also faulty. I think it is the experience of all of us that if we have a patient with marked dysphagia, with uniform dif-

fuse dilatation of the esophagus in which upon dilatation the esophageal contour is preserved, in an individual who is markedly starved, but not toxic, has no gross malignant disease, and who gives a negative Wassermann, we are likely to be dealing with a true cardiospasm, and we should proceed with treatment along such lines even though the etiologic factor may be unknown.

Just one word with regard to exciting causes with respect to after-treatment. I think many of these cases are primarily instituted by some intraabdominal focus of disease—a high lying peptic ulcer, an old appendix, or an old gallbladder. If one expect to secure permanency of cure following mechanical local esophageal treatment, he must see that this intraabdominal pathology is removed before the patient leaves his care.

DR. FREEMAN (closing the discussion): There were a few points brought up in the discussion about which I would like to say a word or two.

Pain has not been a prominent symptom in the cases we have studied. In only five cases was it severe and in these it was referred to the epigastric region.

The results of treatment, in our experience, have not been entirely satisfactory in the late cases. While most of these cases have been symptomatically relieved, the esophagus has remained dilated. This is in contrast to the cases with moderate dilatation where, as far as we were able to judge, the esophagus regained most of its lost muscular tone.

Hypertrophy of the lower end of the esophagus was not found in the cases that came to operation or at autopsy. About the time that Dr. Plummer reported forty cases treated successfully with hydrostatic dilatation, I saw three cases with Dr. Bloodgood. The abdomen was opened in each case; no pathology was found. The lower end of the esophagus was thoroughly dilated after doing a gastrostomy. These patients were completely cured. Two patients with carcinoma in the pyloric region of the stomach had an associated spasm of the lower end of the esophagus. When the stomach was opened, the lower esophagus was found to be normal. In the case that came to autopsy, the patient had apparently had a carcinoma which had developed in an ulcer in the pre-pyloric region. This patient had had symptoms of cardiospasm for ten years. The esophagus was markedly dilated. The autopsy failed to reveal any gross or microscopic evidence of hypertrophy of the lower end of the esophagus.

The diagnosis, in my judgment, cannot be made in many cases from an x-ray examination alone. In addition, I believe all cases of dysphagia, mild or severe, call for a careful endoscopic study and sounding of the esophagus with an olive tipped bougie passed over a silk thread as a guide. I am quite sure that an endoscopic examination will occasionally reveal a superficial ulceration or an abrasion as the exciting factor in the production of spasm which would not be revealed by an x-ray study.



I thoroughly agree with those who discussed the paper that neurosis is not an important factor in the condition.

# SALIGENIN, A NEW NON-TOXIC LOCAL ANESTHETIC AND ITS MERCURY DERIVATIVE, A NEW ANTISEPTIC.\* \*\*

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Old time medicine suffered a great deal from the use of too many drugs. The generation that is passing has suffered, though less, from therapeutic nihilism, and the generation that is to come must have more drugs of less toxicity but better suited to the needs for which they are used, drugs which hit their target hard but leave the other tissues uninjured. The alkaloids which occur in nature all have big molecules in which useful, useless and toxic chemical groups are intermingled with useful ones. In order to attain greater chemical simplicity and lower toxicity we must resort to chemical synthesis of substances whose molecules will contain the physiologically active groups in the very highest degree, but which are stripped of all the necessary groupings that might add to their toxicity.

At the last meeting of the society I reported the results of some clinical and experimental studies upon benzyl alcohol and some allied compounds, as well as upon benzyl benzoate. At that time we had investigated not only benzyl alcohol which Macht had shown to possess properties as a local anesthetic, but also a considerable number of chemically similar phenyl alcohols, phenyl ethyl alcohol, cinnamic alcohol, piperonyl alcohol, saligenin, hemosaligenin, ethyl saligenin, and methyl saligenin, and had found that of this series saligenin was the best.

Saligenin is the alcohol corresponding to salicylic acid and is oxidized to salicylic acid in the body. It is formed in nature by the splitting up of the glucoside salicin by the enzyme emulsion and it can be prepared synthetically in vari-

ous ways. We found that saligenin is distinctly less irritant to the tissues than benzyl alcohol and that it is much more certain in its action. For ordinary purposes of infiltration anesthesia a two per cent solution is satisfactory. It is water soluble up to ten per cent and is from five to ten times less toxic than procaine and from twenty-five to fifty times less toxic than cocaine. Judging from results on the dog and cat (0.4 to 0.7 G per kilo) a man could tolerate up to one or two ounces of the solid drug or 1500 to 3000 mls of a two per cent solution intravenously—or about a gallon subcutaneously.

We have now had a considerable number of minor operations done under two per cent saligenin, in which the anesthesia has been perfect. Whenever possible we have aimed to have the conditions perfectly controlled by injection of saligenin on one side and of procaine or cocaine on the other. Thus, in the removal of small tumors of the neck, Dr. Jos. Stratte, anesthetized one side of the tumor with saligenin and the other side with procaine and the patient found no difference in the anesthesia upon the two sides.

Similar experiences were reported in such operations as the excision of the matrix of the nail of the big toe for the relief of bunions, and also in a considerable number of tonsillectomies done by Drs. Clark, Camp, Beaudoux and Kenneth Phelps using saligenin on one side and procaine or cocaine on the other. In none of these could any difference be noted between the side done under saligenin and the other side except that whatever the anesthetic the side with the most adhesions was always the most uncomfortable. It must be stated however, that in two series of tonsillectomies in which Dr. Phelps used saligenin on one side and apothesine on the other, the patients generally felt less discomfort in the apothesine side than on the saligenin side. This seems rather anomalous, and I have no explanation for it as apothesine is not usually regarded as a particularly superior anesthetic, and yet it must be reported along with the rest.

Apothesine is, however, more than five times as toxic as saligenin, and unpleasant reactions after its use are not infrequent. Thus far we have had no unpleasant reactions after the use of saligenin chemically.

Dr. Martin B. Tinker of Ithaca has used it in

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a case of herniotomy and in some minor surgery with good results, and Dr. Farr has done two thyroidectomies, one operation for the relief of intestinal obstruction and one gastrostomy using large quantities of two per cent saligenin with perfect anesthetics.

At present we are studying the effect of intraspinal anesthesia in cats. In the animals thus far used we have found that the introduction of two mls of two per cent saligenin does not affect the respiration and is safe, while a like amount of one per cent procaine sometimes stops the respiration. The two per cent saligenin in cats gives evidence of complete anesthesia lasting from fifteen to twenty minutes, while one per cent procaine, though more dangerous, lasts about twice as long. It is most likely that in man, owing to the better upright position, stronger solutions and much more prolonged anesthesia can be maintained.

Quite gratifying have been the results which we have obtained with anesthesia in the urethra. On account of the danger from toxicity of cocaine and the scarcity and danger of alypin, the introduction of a non-toxic anesthetic for the urethra is particularly desirable. Dr. Wynne has used a four per cent solution of saligenin applied to the meatus and introduced into the urethra for the cystoscopy of women with particularly tender urethras and in twenty-six cases found the anesthesia perfectly satisfactory.

In some of these women ten per cent cocaine had been used previously and yet they pronounced the saligenin anesthesia as satisfactory as that obtained with cocaine.

We are also experimenting with saligenin as a urethral anesthetic in the male and have not as yet reached definite conclusions. The analgesia obtained seems to be as good as that obtained with cocaine. In a number of cases, however, in which Dr. Thomas has used the Braasch direct cystoscope the patients have had unpleasant erections, apparently more frequent than those following the use of cocaine. This is probably the result of vasodilation. Dr. Cramer and Dr. Wethal however, using the ordinary indirect cystoscope in which there is much less pressure exerted on the prostate and posterior urethra, have not produced any erections, and

in their hands the anesthesia has this far been satisfactory\*

Saligenin also anesthetizes some other mucous membranes, especially the conjunctiva but we have not yet had any clinical tests of its use in this connection. Upon the intact mucous membranes of the mouth less strong solutions do not seem to produce complete anesthesia, but Dr. Wittich has used it successfully to still the pain of a painful ulcer of the tongue, and it probably can be used for many similar purposes. Dr. Meland has also stopped the itching in a case of very stubborn pruritus and by the use of saligenin in a ten per cent ointment; and Dr. W. R. Shannon has stopped the itching of one case of eczema and the pain of one large bunion with a 5 per cent ointment.

In the blocking of the mandibular nerve Dr. Charles Schien has found that a four per cent solution was too weak, but that six per cent solutions gave a nerve block lasting about half an hour. This subject is at present under further investigation.

Upon studying the antiseptic effect of saligenin and its homologues we found that they were all very mild antiseptics so that a one or two per cent solution required from half to one hour to kill the ordinary germs. Our chemist Mr. Merrill C. Hart has therefore prepared a mercury derivation of saligenin by boiling it with mercuric acid, and has obtained a nice crystalline compound containing two atoms of mercury to the molecule with the formula  $\text{Hg}_2\text{O}:\text{CH}_2\text{OH}::\text{HG}:\text{OH}$ .

This compound forms a water soluble sodium salt which is quite stable in distilled water but is precipitated by tap water.

It is not a dye and therefore patients who use it do not reveal the fact upon their underwear. It is about as strong an antiseptic as bichloride of mercury. In other words a 1:10,000 solution of the sodium salt in bouillon kills bacillus coli, staphylococcus albus and the gonococcus in 5 minutes and kills the streptococcus hemolyticus in 10 minutes; while in beef serum bouillon a 1:500 solution kills these germs in 5 minutes. On the other hand, it is much less irritating for the mucous membranes, so that patients can hold a 1:1000 solution in the urethra for five

\*Later results in twenty-eight cases using 8 per cent saligenin have been satisfactory.



minutes without burning or stinging or any subsequent signs of irritation.

Other similar mercury compounds such as the acetate of mercury saligenin and the mercury compound of parahydroxymetanitrophenylcarbinol have about the same antiseptic power and do not seem to possess any advantages over the mercury saligenin.

We have therefore been using mercury saligenin in the Night Clinic for venereal diseases of the University of Minnesota for the treatment of gonorrheal urethritis. We have thus far confined ourselves to the treatment of anterior urethritis since this presents an uncomplicated problem in which the drug can reach the focus of infection and the results of treatment can be accurately followed.

In the uncomplicated cases of anterior urethritis which has been treated at the night dispensary during the past year the average duration has been ninety days and about thirty per cent have developed posterior urethritis, epididymitis or other complications while under treatment. The treatment with mercury saligenin was begun in March of this year and the number of cases thus far treated has been too small to warrant conclusions, but the duration of a number of them has been less than a month, and the number of complications has been about the same so that the present outlook of the treatment is encouraging.

In laying these facts before you at this meeting it has not been intended to present them as a finished research, but merely as a report of progress to show you some of the things that we are attempting to accomplish in the Department of Pharmacology of the University of Minnesota.

#### DISCUSSION

DR. R. E. FARR, Minneapolis: It is perfectly evident that, to men like Professor Hirschfelder, we must look for the development along the lines of better local anesthesia. You know, of course, that all local anesthetics, until recently, were discovered accidentally. Quinine was discovered by making a therapeutic injection of it in cases of malaria. Dr. Hirschfelder is developing this as Ehrlich developed salvarsan. He is following it out scientifically and I am satisfied we will get better anesthetics. We want a better anesthetic for its practical application. We have many local anesthetics that are plenty good enough, so far as anesthesia goes, but we want to cut down the toxicity. Why? Because we want anesthesia quickly and in a manner where we can teach

it to anybody in a minimum amount of time and bring the whole medical profession into this field, and not confine it to a few experts. That, together with a better surgical technic, is what is going to put local anesthesia on the map.

I once used saligenin in a case of hypertrophic pyloric stenosis in a baby that weighed four pounds. That baby had a perfect anesthesia and went through the operation without crying. I had a case of intussusception in a male, with eighteen or twenty inches of the intestine invaginated. We have photographs of that case with the bowel lying out on his abdomen. We have had an acute appendix and two or three other major cases in which we used saligenin. We closed our interthoracic goiter case without drainage, which is a severe test of the drug in relation to wound healing. We opened the wound 2 or 3 days later to let out a blood clot, about the size of a walnut, and once more sealed the wound with adhesive plaster. The patient had no rise of temperature nor any difficulty whatever. Therefore, I am inclined to believe, from the short experience I have had with this new drug, that it has possibilities. I told Dr. Hirschfelder that if I was given a chance to use it in a hundred cases I would be able to tell him more definitely what I think about it. In dealing with matters of this kind we have to depend upon clinical judgment and the personal equation and the facts are hard to obtain.

DOCTOR G. L. LABAT, Paris, France: The subject presented to us is of great interest and proves how much its author is anxious to obtain an ideal anesthesia. We have been using several agents, such as cocain, stovain, and novocain for many years. Novocain has proved to be the best up to date, but though ten times less toxic than cocain, it cannot be used deliberately without risk. I am pleased to know that Dr. Farr's results with saligenin have been very good. I do much more nerve blocking than local infiltration, consequently using smaller quantities of 1 and 2 per cent solutions. As a rule, after making caudal injections we have to wait twenty to thirty minutes before we can obtain a good anesthesia, particularly for dilatation and curettage, perineorrhaphy, and prostatectomy. The anesthesia lasts about two hours. For abdominal or vaginal hysterectomy caudal injection is not sufficient. We have occasionally added to novocain other agents, such as sodium carbonate or calcium chlorid, so as to obtain more rapid anesthesia of longer duration. We have used a 2 per cent solution in these cases and have had satisfactory results. It appears that a 2 per cent solution of saligenin used by Dr. Farr for infiltration purposes is four times weaker than a 2 per cent novocain solution, and this would mean using an 8 per cent solution in caudal injections, with no better results than with novocain. May I suggest that Dr. Hirschfelder be pleased to try and find some other substance which would give us a better sacral anesthesia than novocain. As you know, the nerves in the sacral canal are covered by a very thick imper-

meable membrane which does not permit of easy and rapid diffusion of the anesthetic fluid. The anesthesia is, on the other hand, rapidly absorbed by the venus plexuses, thus giving rise to toxic symptoms. If with these general ideas Dr. Hirschfelder could continue his research work, I am sure we would be grateful to him.

DR. FARR: Would you mind telling us, Professor Labat, what dose you use in caudal anesthesia?

DOCTOR LABAT: We have two solutions, a 1 per cent solution and a 2 per cent solution. Of the 1 per cent solution I use from 40 c.c. to 60 c.c., and of the 2 per cent solution, from 20 c.c. to 30 c.c., adding in every case 20 drops of adrenalin to 100 c.c.

DR. G. J. THOMAS, Minneapolis: I think Dr. Hirschfelder deserves great credit for giving us a new and safe local anesthetic, and he should have every encouragement to continue his work.

I know in doing urological work at the dispensary and hospital we are satisfied with cocain and novocain and it is difficult to get us to change. I have, after many requests from Dr. Hirschfelder used saligenin for dilation of stricture of the urethra, for treatment and operations about the urethra and bladder and in a small number of cases I have found it just as satisfactory and as safe as when using cocain or novocain. I have not been able to compare the results of saligenin with cocain in the same individual.

In doing cystoscopy, which is a painful procedure it is difficult to know how much anesthesia is produced by any anesthetic because the personal element of the patient and nervousness must always be considered. After we have had a hundred cases we will be able to give Dr. Hirschfelder more definite information as to what saligenin will do in the urinary tract.

I think such work as Dr. Hirschfelder is doing is the sort of work that will give us new ideas. It is commendable work and we as clinicians must certainly encourage much more than we do the work of the laboratory worker and the experimental worker.

DR. HIRSCHFELDER (closing the discussion): I

would like to say to the members of the Association that I have brought this report before you simply in the form of a report of progress, without making any definite and final claims. Unfortunately, as I stated in my paper, the mere question of the manufacture of a chemical substance, even one that is fairly simple to synthesize, is a different thing from the manufacture of the same substance on a factory scale.

There are at present two or three firms engaged in the problem of getting this substance on a factory production basis, and we hope therein it will be on a factory or at least on a middle scale production, and then it will be possible for me to submit enough material to Dr. Farr and to Dr. Thomas to give the thing a proper trial. The thing I have been trying to do and have reported to you was merely to sketch an outline of the possibilities along which we hope to develop it, and not to give any final report. Therefore, as I have previously remarked, I am not claiming anything except introducing a new drug which I think has some possibilities.

As to the question of the introduction of caudal anesthesia. We took that up at the suggestion of Dr. Litzenberg because he wanted us to try out some caudal anesthesia, and we are still in the stage of trying it out. I will say, however, to Professor Labat that we have found the use of procain in one or two per cent solution satisfactory for intraspinal anesthesia in cats, though it is dangerous. I feel very little hesitation in saying that we can go up to as high as a 6 per cent saligenin solution without incurring even comparable toxicity. Two c.c. of 1 per cent procain will stop the respiration in the cat where we can get satisfactory anesthesia lasting for as long as twenty minutes, with only 2 per cent of saligenin. The quantity which Professor Labat uses, 40 to 60 c.c. of 1 per cent, or 20 or 30 c.c. of 2 per cent in the caudal canal is very large. I believe Dr. Farr uses 4 ounces of 1 per cent. I have no hesitation in foretelling that we will be able to use a much higher concentration of saligenin than that which we have been using in our experimental work on the cat, which, in matters of spinal anesthesia is so sensitive that it has not nine lives, but only about half a life.





# MINNESOTA MEDICINE

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The Minnesota State Medical Association.

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Vol. IV

June, 1921

No. 6

## EDITORIAL

### RECONSTRUCTIVE SURGERY

Elsewhere in this issue\* appears an article which gives a broader view to the responsibilities put on surgery than is generally understood to be imposed. As medicine has certain responsibilities toward the prevention of disease and also toward the public health in general, so has surgery an obligation quite comparable. Besides the nice questions of surgical diagnoses, necessity of operative interference, surgical pathology, mechanical ability, manual dexterity and the other factors that enter into careful surgery of today, comes the necessity for careful consideration of etiology in both diseased conditions and injuries. Then, as it is necessary to know how an accident happened surgeons must accept the responsibility for prevention of these happenings. It is not enough to patch up the broken parts after the happening, the actual happening must be prevented. So, also, it is not enough to supervise the recovery of a patient to the point where he leaves the hospital; surgery must return him to work, must make him again a factor of economic importance in the world. The development of this

idea has been rapid. Begun as a factor of great economic importance in industrial surgery, it developed to a high degree of usefulness with great rapidity during the war in the return of the troops to their line of duty; and today there is a wide chance for usefulness, to salvage the human scrap-heap in our midst and return the individual units to the ranks of useful citizenry.

The general public has learned of rehabilitation and kindred expressions from the efforts which the government has put forth and has learned the practicality of the procedures and will cooperate intelligently with any constructive efforts surgeons may make to make the scheme more widespread. As a group the medical profession must watch itself well that no chance of serving the public as a whole is neglected. In our desires to perpetuate the medical profession with a few and better doctors we must not let the public suffer for medical attention; nor because of a paucity of regular medical practitioners can we let the various cults and paths grow up to lower the standards of scientific attention which we are educating the public to expect. There is a certain sociological side to medicine as a profession that must not be lost sight of in our development of medicine as an individualistic science.

It is likely that we are neglecting large opportunities of service to the handicapped in our cities of the Northwest today. We do not know of any place with machinery for dealing with these problems nor a group comparable to the Service League for the Handicapped from the Board of Education mentioned in the article. Some scheme of this sort should be carried on by the laity with medical supervision and made uniform for the entire state by placing it under the state government. Every place large enough to have a factory or like enterprise is large enough to have a hospital and has also some sort of a scrap-heap with which work can be done. A helping hand extended wisely will take from the group of dependents and add to the ranks of useful citizenry.

By applying in these times of normalcy some of the conditions begun in industry and developed during the war, the medical profession will be accepting one of its responsibility to the people.

C. E. S.

\*Reconstructive Surgery, Harry E. Mock, M. D., F. A. C. S., Chicago, Ill., page 343.

## THE CATHOLIC HOSPITAL ASSOCIATION

Last year, in June, the Catholic Hospital Association, enrolling most of the Catholic hospitals in the United States and Canada, met at St. Thomas College. This was the fifth annual convention; the first was held at Milwaukee in 1916.

The association may be said unqualifiedly to have been the product of the foresight, energy and enthusiasm of its president, Rev. Charles B. Moulinier, S. J., of Marquette University. His interest in Catholic hospitals came through his early recognition of the vital part they should play in medical education. When the early effort at the organization of the medical colleges was directed toward Marquette, his keen appreciation sensed the righteousness of the move, and he at once became a very vigorous ally of such pioneers in this movement as Flexner and Bowman. With the latter he has spent a large part of the past two years traveling over the United States and Canada, assisting in the standardizing educational propaganda of the American College of Surgeons.

The various Catholic Sisterhoods, taken as a whole, have made hospital work one of their chief endeavors. The result is that a very large percentage of all hospitalization is in their hands. However critical those conversant with the facts may be, few would ever be able to say that their intentions and desires were not always of the purest, the most sublime and self-sacrificing. In other words, Father Moulinier foresaw that while the various Sisterhoods might be short on many technical matters, they had an enormous advantage in their permanency, their devotion to their life work, and their cordial relations with large masses of people. Accordingly, it has been a great inspiration to see how wholeheartedly they have entered into the full spirit of co-operation, for an improvement of their standards and betterment of their service.

This should be brought to the attention of Minnesota particularly, because, due to the superb facilities provided by St. Thomas College and the Catholic Sisterhoods and convents of both St. Paul and Minneapolis, the association is to meet again at the same place this year, June 21st to June 25th. This return engagement, as it were, is of striking enough interest

to merit particular attention, and reflects not a little credit on Minnesota. It is not often that a convention chooses to meet, at least on succeeding years, in the same place. The officers of the association this year had particularly desired to meet in the East, or at least as far east as Pittsburgh. However, inasmuch as a large number of Sisters attend the conventions, and due to their inability to utilize public accommodations must have provided living quarters and refectory facilities by their Sister associates, no city could be found in the Middle East that could accommodate the large number that will attend. Further, the St. Thomas College buildings provide ideal lecture and conference rooms, as well as space for the numerous commercial exhibits. These facilities again bring to mind the cramped, unsuitable hotel quarters in which most of our medical conferences are held.

Naturally, the clergy and Sisters from near and far, coming to these conventions, learn something of Minnesota and its cities, and much there is to offer. Nevertheless, this very opportunity points also to our responsibilities. All of our large Minnesota cities have splendid Catholic hospitals. St. Mary's in Minneapolis is one of the most modern and exquisitely furnished hospitals in America, with an unparalleled location on the very banks of the Father of Waters, opposite the University; St. Mary's in Rochester did not need its perfectly huge new addition to give it world wide fame; St. Joseph's in St. Paul, is a splendid older institution, with the very finest hospital traditions, and counts on its staff, past and present, many men who have made medical history in Minnesota, men who have helped give to St. Paul something of the atmosphere that comes only to those cities that have had a succession of studious men in the learned professions.

Hospital Progress is the official organ or magazine for the association, and is published in Milwaukee by the Bruce Publishing Company. This journal jumped at once into a very wide circulation, and furnishes a constant medium of helpfulness to its numerous readers. The technical excellence of this hospital paper is in part accounted for by the fact that its publishers had already made a great success of certain other publications, notably an educational journal. Much credit is also due Dr. B.



F. McGrath, the secretary, who in addition to editing the *Journal* and conducting the business affairs of the association, occupies the chair of experimental Surgery in Marquette University.

It has been hinted in some quarters that hospital standardization may ultimately arrive at a point where the physician is only a cog in the machinery. This is a reflection from the time when certain striking medical personalities were the whole troupe, and insisted on having the spotlight centered on them all the time. This was a shortsighted policy, both for the physician and the hospital, because it gave a sense of security, both medically and scientifically, that was unjustified. Towering personalities, such as Osler and J. B. Murphy, left their deep impression on their respective institutions in which they worked. Osler on the one hand, however, left his impression indelibly written into the personalities and points of view of those who succeeded him; America, and Chicago particularly, have suffered in an unknown measure because Murphy did not teach his immediate associates as he did his remote admirers. There is developing presently a fine productive spirit about the hospitals of Boston: the Massachusetts General and the Peter Brent Brigham will reflect this long after Cabot and Christian have passed off the stage. Now, this tendency for the growth of hospital personalities we should all foster and encourage.

The Catholic Hospital Association is to be our guest again this year. We medical men should go to the meeting in as large numbers as possible. All our hospitals should see to it that representatives and members of the staff are in attendance, and that they will bring back the numerous instructive points from the most abstruse ethical considerations that should guide us, to the simplest advice as to the best way to operate a laundry. Too many of us do not take seriously enough the myriad problems that confront the present day hospital. We have not come to see fully enough, as yet, how large a part of our profession the hospital has come to be. With the present rather extravagant tendency for men to group themselves for general diagnostic and surgical practice, the opportunities afforded by a well balanced staff have not been given sufficient contrasting considera-

tion. Nearly all the advantages of so-called "Group Medicine," could be attained by the practical utilization of the equipment of a modern hospital of 75 or more beds, provided a well balanced staff would see fit to merge its personal interests sufficiently to give the patient the benefit thereof. Among other matters of interest offered in the medical portion of the convention program, will be an evening session for doctors, held at the St. Paul Hotel, and portraying "An Ideal Staff Meeting."

E. L. T.

#### MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

##### Physicians Licensed April, 1921

Anderson, Howard Clayton, care of General Hospital, Minneapolis, Minn.

Diehl, Harold Sheely, 1321 6th St. S. E., Minneapolis, Minn.

Engstrand, Oscar Julius, care of Swedish Hospital, Minneapolis, Minn.

Fitz, Reginald, Rochester, Minn.

Foss, Allen Richard, care of General Hospital, Minneapolis, Minn.

Habein, Harold Clinton, care of University Hospital, Minneapolis, Minn.

Hall, Earl Chauncey, care of General Hospital, Minneapolis, Minn.

Keith, Norman Macdonnell, care of Mayo Clinic, Rochester, Minn.

McBeath, Ewing Cleveland, care of St. Mary's Hospital, Minneapolis, Minn.

McVicar, Chas. Stanley, care of Mayo Clinic, Rochester, Minn.

Napoliello, Vincent, 414 Oak St. S. E. Minneapolis Minn.

Wagner, Charles Edward, Lock Haven, Pa., 527 W. Main street.

##### THROUGH RECIPROCITY

Abramson, Benj. Wm., Anamoose, N. D.

Amberg, Samuel, Rochester, Minn.

Anderson, Richard Elseph, Willmar, Minn.

Bernard, Bethune Caldwell, Lake Park, Minn.

Bonta, Maurice Buford, Rochester, Minn.

Bozer, Hermann Eugene, Rochester, Minn.

Brandt, Arnold Louis, Red Wing, Minn.

Brown, George E., Rochester, Minn.

Chambers, Edward Francis, S. Rochester, Minn.

Chandler, Orville Barnes, care of Miller Hospital Clinic, St. Paul, Minn.

Desjardins, Arthur Ulderic, Rochester, Minn.

Edlund, Gustaf, Jr., care of Miller Hospital, St. Paul, Minn.

Figi, Fred Adam, Rochester, Minn.

Greene, Willard Parker, 4006 W. 44th St., Morning-side, Minneapolis, Minn.

Greenfield, William John, Rochester, Minn.  
 Hardt, Leo Louis, Rochester, Minn.  
 Harrington, Stuart William, Rochester, Minn.  
 Helmholtz, Henry Frederic, Rochester, Minn.  
 Kohlbry, Carl Otto, 600-700 Fidelity Bldg., Duluth, Minn.

Lissack, Edmund H. M., Waseca, Minn.  
 Osburn, John N. N., 1009 Nicollet Ave., Minneapolis, Minn.

Sherman, Carnot H., Marine-on-St. Croix, Minn.  
 Shillington, Maurice A., care of N. P. Hospital, Brainerd, Minn.

Walters, Henry Waltman, Rochester, Minn.

#### NATIONAL BOARD CREDENTIALS

Magath, Thos. Byrd, Rochester, Minn.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### PROGRAM

Mid-Summer Meeting Southern Minnesota Medical Association, Winona, Minnesota, Monday, June 27th and Tuesday, June 28th, 1921

### OFFICERS

Dr. W. J. McCarthy, Madelia, President.  
 Dr. G. F. Merritt, St. Peter, Treasurer.  
 Dr. H. T. McGuigan, Red Wing, Secretary.  
 Dr. A. F. Schmitt, Mankato, Director.

### AFTERNOON SESSION, ARMORY

Monday, June 27th, 1921, 1:30 o'clock P. M.

Dr. O. J. Hagen, Moorhead, Minnesota, "Relation of Acute Infection to Chronic Disease."

Dr. N. J. Nessa, Sioux Falls, South Dakota, "X-Ray Diagnosis in Diseases of the Gastro-Intestinal Tract."

Dr. E. S. Judd, Rochester, Minnesota, "Surgery of the Ureter."

Dr. E. C. Rosenow, Rochester, Minnesota, "Further Results in the Serum Treatment of Poliomyelitis."

Dr. T. B. Magath, Rochester, Minnesota, "Echinococcus Diseases: Etiology and Laboratory Aids to Diagnosis."

Dr. H. C. Bumpus, Rochester, Minnesota, "Relation of Focal Infection to Diseases of the Urinary Tract."

### EVENING SESSION

Monday, June 27th, 1921

Masonic Temple, 6:30 o'clock P. M.

### BANQUET

Dr. D. L. Edsall, Boston, Massachusetts, "Some Public Relations of Medicine, Especially in Connection With Industry."

Dr. F. J. Gaenslen, Milwaukee, Wisconsin, "The Diagnosis and Treatment of Chronic Lesions of the Hip Joint."

Dr. A. B. Kanavel, Chicago, Illinois, "Surgery of the Hand."

### FORENOON SESSION, ARMORY

Tuesday, June 28th, 1921, 8 A. M. to 12 M. Business Meeting.

Dr. W. O. Ott, Rochester, Minnesota, "Diagnosis and Treatment of Sciatica."

Dr. J. T. Schlesselman, Mankato, Minnesota, "Nasal Accessory Sinus Infection."

Dr. H. B. Zimmerman, St. Paul, Minnesota, "Intestinal Obstruction."

Dr. G. B. New, Rochester, Minnesota, "Treatment of Multiple Papillomas of the Larynx in Children."

Dr. S. A. Slater, Worthington, Minnesota, "The Child's Place in the Tuberculosis Campaign."

Dr. H. E. Michelson, Minneapolis, Minnesota, "Comparative Values of the Antisyphilitic Drugs."

Dr. H. F. Helmholtz, Rochester, Minnesota, "Par-enteral Infection in Infancy."

### ANNOUNCEMENTS

#### HEADQUARTERS AT HOTEL WINONA

The Winona County Medical Society, The Winona Country Club, The Winona Elks Club, The Winona Kiwanis Club, and The Civic and Commerce Association of Winona invite and extend a cordial welcome to the Southern Minnesota Medical Association, and all members, their wives and sweethearts, and to the friends of the medical profession to come to Winona, June 27th and 28th, and enjoy the hospitalities that the good people of Winona will offer.

Reservations for Banquet and Hotel accommodations should be secured from the Chairman Committee of Arrangements.

Applications for Membership should be made at the Secretary's Desk.

All communications relative to the program should be addressed to Dr. A. F. Schmitt, Mankato, Minnesota.

## OBITUARY

James Wiley Grant, M. D., Richville, Minn., died April 8, 1921, at the age of seventy-four years.

### MEMORIAM TO DR. GILLETTE

Arthur J. Gillette is dead. No man was ever more unselfish or more true to the spirit of his chosen career. Nor did man ever achieve more of lasting good for the community than he. He died in the full time of activity, beloved by his colleagues, esteemed not only as a surgeon but as a man. His sympathies were broad and his untiring efforts in behalf of the crippled and deformed continued unabated up to his death.

Dr. Gillette was born in Rice county, Minnesota, on October 28th, 1863, educated in country schools, Hamline University and the Minnesota College Hospital. He later attended the St. Paul Medical School, from which he graduated in 1886. He then served in the New York Orthopedic Dispensary and Hospital as Resident Surgeon for a period of one year. In 1888 he joined the Ramsey County Medical Society and acted as Treasurer throughout the two



following years, being President of that society in 1896. He was a charter member and in 1900 President of the American Orthopedic Association. In 1908 he was President of the Minnesota Academy of Medicine and was Professor of Orthopedic Surgery at the University of Minnesota up to the time of his death.

In 1897 he conceived and carried to completion the idea which found expression in the State Hospital for Indigent Crippled and Deformed Children, which will ever remain a lasting monument to his creative vision and executive genius.

His lofty ideals, unselfish motives and constant friendship won him early and wide recognition as a leader in his chosen specialty. He will be long remembered by all with whom he came in contact, both for his gentle and considerate kindness and for his professional attainments.

C. EUGENE RIGGS,

ROBERT EARL,

WALLACE H. COLE,

for the Ramsey County Medical Society.

## OF GENERAL INTEREST

Dr. A. E. Amundsen, of Little Falls, attended the clinic recently held in Minneapolis.

Dr. M. M. Hursh, of Grand Rapids, Minn., attended the recent clinic held in Minneapolis.

Dr. John F. Fulton, of St. Paul, announces the removal of his offices to 728 Lowry Building.

Dr. F. W. Ostergren, 991 Payne Avenue, St. Paul, is convalescing from an operation for appendicitis.

Dr. W. G. Strobel, of Welcome, has become associated with the Duluth Clinic, Department of Surgery.

Dr. C. W. Bray, of Biwabik, has been reappointed as a member of the St. Louis County Child Welfare board.

Dr. H. Holte, of Crookston, has returned to resume the practice of medicine with the Northwestern Clinic.

Dr. Carl O. Kohlbry, of St. Louis, Mo., has become associated with the Department of Pediatrics at the Duluth Clinic.

Dr. R. D. Gardner, of Eveleth, has gone to International Falls where he will be associated with Dr. B. F. Osborn.

Dr. B. Odegaard, of Albert Lea, expects to move to Emmons, Minnesota, where he will engage in general practice.

Dr. J. N. Risjord has returned to Fertile from Chicago where he has been spending the past six months in medical studies.

Dr. Walter E. Scarborough, of Faribault, has gone to Chicago, where he will take a two months post graduate course in medicine.

Dr. G. A. Stevenson, of Albert Lea, has recently returned from Chicago where he has spent the past few weeks in study of diseases of the eyes.

Dr. James A. Johnson, Minneapolis, read a paper on Hidden Malignancies at the spring meeting of the Red River Valley Medical Society at Crookston.

Dr. Louis H. Warfield, of the Medical College of the University of Wisconsin, addressed a recent meeting of the St. Louis County Medical Society held at Duluth.

Dr. Henry G. Collie, of Brainerd, sailed April 6th for England. His position at the Northern Pacific Hospital will be temporarily filled by Dr. M. A. Shillington, of Minneapolis.

Dr. Horace M. Brown, of Milwaukee, delivered a Mayo Foundation Lecture April 8; his subject was, "The anatomical habitat of the soul: Hammurabbi to Harvey and beyond."

Dr. George E. Putney, of Paynesville, has been recommissioned a member of the State Board of Medical Examiners by Governor Preus. The appointment is for a term of three years.

Dr. B. F. Holm, of Wells, Minn. has sold his practice to Drs. F. E. Best and S. H. Anderson. Dr. Holm expects, later in the summer, to go East where he will take up a post graduate course in medicine.

Dr. E. Schatz, of Montgomery, has recently returned from Chicago where he has been taking a post graduate course in medicine. He is planning to move to St. Cloud where he will engage in general practice.

Dr. H. E. Peterson, of Granite Falls, has received word from the Federal authorities that he has been appointed Medical Examiner at Granite Falls for the Bureau of War Risk Insurance for the ensuing year.

Dr. P. A. White, formerly of the Mayo Clinic, who has been associate surgeon of the Aberdeen Clinic, at Aberdeen, S. D., is leaving for Davenport, Iowa, where he will practice surgery with Dr. William Allen, of that city.

Dr. John N. Osburn, of the Episcopal Eye and Ear Hospital of Washington, has become a member of the Nicollet Clinic. He is to be associated with Dr. William R. Murray in the division of Ophthalmology and Oto-Laryngology.

Dr. Gilbert J. Thomas, Minneapolis, read a paper, "A new diagnostic sign in tumors of the pelvis of the kidney, with report of a case of papillary adenocarcinoma", at the March meeting of the Chicago Urological Society.

Dr. Frank T. Cavanor, of Minneapolis, left April 9th for post-graduate work in Harvard and Columbia Universities. Drs. John S. Macnie and John H. Morse, 503 Donaldson Building, will care for Dr. Cavanor's patients while he is away.

Dr. Julia Keats Erb, of Minneapolis, a classmate of the late Dr. Flora L. S. Aldrich, of Anoka, has made arrangements to locate in Anoka. She will move to that place as soon as she can sever her connections with the Abbott Hospital at Minneapolis.

The Minnesota State Legislature has just passed a law compelling every person employing help of any kind except domestic to insure his liability or furnish

an indemnity bond to the state. This effects every physician in the state who employs clerical assistance.

At a recent weekly meeting of the staff members and employees of the Mayo Clinic, Drs. Hartman and Lockwood gave a most interesting account of their recent trip to Mexico, where they were called upon by President Obregon to perform a slight operation.

Dr. H. V. Hanson, formerly of New London, Minn., has become associated with the Union Clinic at Willmar. Dr. Hanson served as surgeon with the English army for twenty-two months during the World War. He will specialize in diseases of the eye, ear, nose and throat.

Dr. and Mrs. Woodward L. Colby, of St. Paul, have closed their home at 2103 Iglehart Avenue, and have gone to Chicago where Dr. Colby is attending clinics. He will leave soon for the East where he will enter Harvard Medical school for post graduate work in pediatrics.

The Division of Venereal Disease of the Minnesota State Board of Health calls attention to the fact that the last Congress failed to make any appropriation for their activities, and inasmuch as the State Legislature did not increase its previous appropriation of \$30,000, their activities, of necessity, will be curtailed during the coming year. The co-operation of the profession of the state is requested.

The recent Institute of Venereal Disease Control and Social Health Service in Washington showed an attendance of about six hundred and fifty, and the interest seemed to warrant the planning of a general public health institute to take place in the fall of 1921. A great variety of courses on the subject of public health and sanitation will be offered at this time by the recognized authorities in the various branches.

The *Nation's Health* is the new name, beginning formerly known as *Modern Medicine*. This magazine was originally known as the *Interstate Medical Journal* and its scope has gradually changed from a clinical journal to one devoted to the broad field its name now implies. Curative medicine will not be included in the subject material handled by the *Nation's Health*, but instead, problems of health related to industrial units, schools, infant and child welfare, school health and related activities.

The Cooperative Health and Nursing Service with headquarters at 438 University Avenue, St. Paul, has been instituted to furnish home nursing to families whose incomes range from \$1000 to \$2500. The service was instituted by the Housewives' Union and consists of visits by an employed graduate nurse in acute and chronic cases not ill enough to go to a hospital. One of the rules adopted requires that no case may be cared for more than twenty-four hours unless a physician is in charge. This Service as it expands may solve some of the difficulties confronting the individual with small income when sickness comes.

The Post Graduate School of the Vienna Medical School announces a series of medical courses for June, 1921, and calls attention to the fact that foreigners may take courses in the Post Graduate School both in German and in English. A nominal charge of one thousand crowns (about \$1.50) is charged to cover expenses for those attending the official lectures. Special courses may be arranged as before the war. On the program are seen the names of Professors Eiselsberg, Marburg, Schlesinger, Kovacs, Lorenz, Eppinger, Ortener, Frankl, Erdheim, Falta, Weibl, Adler, Zappert, Schick and Pirquet. The absence of the von in this program is noticeable.

## NEW AND NON-OFFICIAL REMEDIES

During April the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

**Armour & Co.:**

**Suprarenalin Solution-Armour.**

**The Diarsenol Co.:**

**Silver Diarsenol,**

0.05 Gm. Ampules

0.1 Gm. Ampules

0.15 Gm. Ampules

0.2 Gm. Ampules

0.25 Gm. Ampules.

**Hynson, Westcott & Dunning:**

**Mercurochrome-220-Soluble.**

**Arsphenamine-Squibb.**—A brand of arsphenamine N. N. R. (seen New and Non-official Remedies, 1921, p. 41). Arsphenamine-Squibb is marketed in ampules containing, respectively, 0.1 Gm., 0.2 Gm., 0.3 Gm., 0.4 Gm., 0.5 Gm., 0.6 Gm. Arsphenamine. E. R. Squibb & Sons, New York.

**Neoarsphenamine-Squibb.**—A brand of neoarsphenamine N. N. R. (New and Non-official Remedies 1921, p. 45.) Neoarsphenamine-Squibb is marketed in ampules containing, respectively, 0.15 Gm., 0.3 Gm., 0.45 Gm., 0.6 Gm., 0.9 Gm. Neoarsphenamine.

**Sodium Arsphenamine-Squibb.**—A brand of sodium arsphenamine N. N. R. (see New and Non-official Remedies 1921, p. 48). Sodium arsphenamine-Squibb is marketed in ampules containing, respectively, 0.15 Gm., 0.3 Gm., 0.45 Gm., 0.6 Gm., 0.75 Gm., 0.9 Gm. sodium arsphenamine. E. R. Squibb & Sons, New York. Jour. A. M. A., April 9, p. 1007).

### PROPAGANDA FOR REFORM

**Digifolin not admitted to N. N. R.**—Digifolin-Ciba is a product of the Society of Chemical Industry of Basle, Switzerland. It is claimed to be "a preparation of digitalis leaves, that has been freed from their useless and harmful principles such as digitonin (saponin), coloring and inert matter, etc., but does contain all the really valuable and therapeutically



active constituents of the leaves, namely; digitoxin and digitalein in their natural proportions. The Council on Pharmacy and Chemistry reports that there is no evidence that digifolin contains all of the glucosides of digitalis as they exist in the leaf and that it is extremely improbable that this is the case, because one cannot remove the saponin without altering the other active principles of digitalis. The Council also held unwarranted the claim that Digifolin does not have the disadvantages of galenical digitalis preparations since it is well established that the untoward effects of digitalis are inherent in the principles that exert the desired effects of digitalis and that these may be avoided largely by a carefully regulated dose of any digitalis preparation. The claim that Digifolin-Ciba has all the advantages and none of the disadvantages of digitalis has been refuted so frequently that manufacturers must be aware that it is untenable. Further, the report concludes, the claims now made for Digifolin are essentially those made nearly four years ago, at which time the attention of the American agent was called to their unwarranted character (Jour. A. M. A., April 2, 1921, p. 952).

**Hexamethylenamin and sodium acid phosphate.**—Hexamethylenamin acts in acid urine only. Hence, if the urine is not acid, sodium acid phosphate should be given in doses of 1 to 2 gm. midway between the doses of hexamethylenamin. Enough of the sodium acid phosphate should be given to render the urine acid, but not enough to cause diarrhea (Jour. A. M. A., April 9, 1921, p. 1031).

**More Misbranded Nostrums.**—The following preparations have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act, on the ground that the therapeutic claims made for them were false and fraudulent: *Treatamiento Zendejas* (Panfilo Zendejas), a solution containing potassium iodid, plant extractives and sugar. *Helmitol* (Bayer Co., Inc.), tablets consisting of hexamethylenamin, methylenecitrate and talc. *Benetol Vaginal Suppositories* (Benetol Co.), consisting essentially of alpha and beta naphthol, boric acid and traces of menthol and phenol in a cacao butter base. *Mowerys Gonorrhea Paste* (Binkley Medicine Co.), essentially powdered cubebs, copaiba balsam, alum and magnesia (Jour. A. M. A., April 30, 1921, p. 1263).

**Cod Liver Oil in Rickets.**—For many years cod liver oil has been regarded almost as a specific against rickets in children. During recent years it has been made reasonably certain that the administration of cod liver oil alters the calcium balance in such a manner that calcium will be retained in the body and that it increases the capacity of rachitic children to take up and hold calcium. Since the beneficial effects of cod liver oil on rickets may be due to its liberal content of vitamine A, frequently described as the Fat-Soluble food accessory, it is interesting to know that crude unrefined cod liver oil may be

250 times as rich as butter in vitamine A and that samples of refined oil, although not so active as the crude oil, were, also far superior to butter in their vitamine potency. The ease with which the Fat-Soluble A Vitamine of cod liver oil is destroyed by reagents and drastic manipulations make the various "refinements" of cod liver oil products sold as proprietary preparations even more reprehensible than they have seemed in the past (Jour. A. M. A., April 9, 1921, p. 1009).

**Some of Loeser's Intravenous Solutions.**—The Council on Pharmacy and Chemistry reports that Loeser's Intravenous Solution of Hexamethylenamin and Sodium Iodid, Loeser's Intravenous Solution of Sodium Salicylate, Loeser's Intravenous Solution of Salicylate and Iodid, Loeser's Intravenous Solution of Sodium Iodid and Loeser's Intravenous Solution of Mercury Bichlorid, manufactured by the New York Intravenous Laboratory, were not accepted for New and Non-official Remedies because they are sold under misleading claims regarding their alleged safety and efficiency. The fundamental objection to the claims made for these preparations is the general claim of superiority and safety of the intravenous method. The Council continues to hold that intravenous medication generally is not as safe as oral medication, even with relatively harmless substances and that it does not give "improved clinical results" except under rather narrowly confined circumstances, namely, if the drug undergoes decomposition in the alimentary tract, if it is not absorbed, if it causes serious direct local reactions, or if time is an urgent element. The Council has recognized intravenous preparations which satisfy these requirements. The Council concluded that these solutions did not meet these conditions (Jour. A. M. A., April 16, 1921, p. 1120).

**Benzyl Benzoate.**—This drug has been widely accepted, chiefly on the basis of experiments on excised organs as an efficient antispasmodic agent for smooth muscle in various regions. Few observations have been made, however, as to its action on intact organs. Recent investigation has raised serious doubt as to the efficiency of benzyl benzoate as an antispasmodic for the intact uterus, intestines, stomach and bronchi. Large doses injected into dogs intravenously (so that the drug might act on the smooth muscles of these organs) gave almost totally negative results. This investigation suggests that allowances should be made for impressions, reflex influences, the psychic state and natural recovery before drawing definite conclusions as to the beneficial effect of benzyl benzoate, especially in such capricious conditions as hiccup, whooping cough, asthma and dysmenorrhea for which it has been advocated (Jour. A. M. A., April 30, 1921, p. 1252).



## BOOK REVIEWS

### RATIONAL TREATMENT OF TUBERCULOSIS.

Charles Sabourn, English Translation, Sixth Edition. F. A. Davis Co. Price \$3.50.

The author aptly titles his work the "rational" treatment of pulmonary tuberculosis.

It is a book which every general practitioner should read as well as those particularly interested in chest diseases.

The fundamental measures, rest, pure air, wholesome food are dilated upon, and of equal if not of more value, the small, apparently insignificant (to the physician) complaints which are so frequently passed off with a light word. Codliver oil, iodine, creosote, over feeding, phosphites are discarded by the author. Tuberculin, he thinks, is in the "state of hesitation".

The author's "ambulatory treatment of hemoptysis" is rather startling but sounds plausible.

The chapter on sanitoriums is excellent. The author argues strongly and effectually for institutional treatment and very pointedly remarks that a santatorium is no better than the physician in charge of it. No climate exists, he reiterates, which will cure tuberculosis.

Artificial pneumothorax and the care of laryngeal cases were not mentioned by the author which constitutes a rather serious omission.

On the whole it is a worth while book and merits the attention of the profession.

EVERETT K. GEER.

### EXOPHTHALMIC GOITER AND ITS NONSURGICAL TREATMENT, by Israel Bram, M. D., C. V.

Mosby Company, St. Louis. Octavo, Cloth, pp. 438.

The author in explaining the existence of this volume hopes (1) to stimulate keener interest in the disease in question. (2) To convince that exophthalmic goiter does not belong in the realm of surgery. (3) To urge an early diagnosis and institute proper non surgical treatment. Continuing he gives in detail the anatomy, physiology, pathology, symptomatology, diagnosis and differential diagnosis, diagnostic tests, course and prognosis, non surgical treatment, and closes with case histories.

The reviewer cannot help feeling that this volume is a splendid general resume on exophthalmic goiter, but presents little that is new or original and impresses one with the idea that its sole existence is to present the non surgical treatment of exophthalmic goiter and especially the use of quinine hydrobromate, which the author considers specific. In view of the fact that the author is unable to determine the causative factor of Graves disease or to describe how quinine hydrobromate exerts its beneficial effects, it would seem unreasonable to accept this treatment as specific, nevertheless we must recognize the results obtained in his large series of cases, but

until more conclusive results are obtained by purely medical treatment, we must concede to surgery its place in the treatment of the disease.

W. C. RUTHERFORD.

### HARROWERS MONOGRAPHS ON THE INTERNAL SECRETIONS: Hyperthyroidism, Volume I, No. 1.

This excellent monograph is one of a series of publications by the author on the medical aspects of the internal secretory glands.

The merits of the monograph depend largely on the stress laid upon the systematic searching for the origin of this symptom-complex, which he believes to be a toxemia, either chemical, bacterial or emotional and under the etiology covers the predisposing influences, the paramount importance of focal infection and endocrine dysfunction.

The symptomatology is well displayed giving more particularly the neurological, ocular and circulatory aspects.

In the diagnosis the importance of metabolimetry along with clinical and laboratory tests such as: Loewi's mydriasis, Goetsch, thyroid function, glucose tolerance, quinine, Abderhalden's ferment, pituitary and other tests is brought out.

In the differential diagnosis the neurosis, adrenal dysfunction, tuberculosis and simple goitre are differentiated.

The prognosis of hyperthyroidism in his opinion is not good.

Treatment from all angles is considered, as, general hygiene, hydrotherapy, x-ray, radium, drugs and organotherapy. His patients are put on a routine regime which consists of absolute rest, well balanced diet, Crotties sedative formula, removal of focal infection and the study of possible endocrine causes.

This is a very interesting work, well written and arranged and should be of interest to the surgeon as well as the internist.

A. P. GRUENHAGEN.

### PLASTIC SURGERY OF THE FACE, By H. D. Gillies, C. B. E., F. R. C. S., Major R. A. M. C.

This is a rather extensive and complete work, based entirely on war injuries.

The first chapter is devoted to a short history of plastic surgery and a discussion of the principles to be considered in performing plastic operations. The main text is made up of individual cases with pictures and illustrations before and after treatment, together with history and treatment of each case. The individual cases are grouped according to the location and character of injury, making it a very useful reference work to men interested in plastic surgery.

C. B. TEISBERG.





## PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

*Cases Presented at April Meeting of Minnesota  
Academy of Medicine. April 13th, 1921.*

Dr. E. S. Judd, Rochester, Minn.

### 1. CASE NO. 247737.

J. B. D., male, age 22 years. Married 18 months. Family and personal history negative. Denies lues and specific urethritis. Operated for left indirect inguinal hernia October 8, 1918. Uneventful convalescence. In hospital 10 days. (3-23-21) Since left herniotomy here in Oct., 1918, has had two or three spells of pain a year lasting 6 or 7 days at a time. Pain acute, severe, comes on about 10 minutes after urinating, doubles him up, lower left quadrant at site of herniotomy scar, referred to left testicle, lasts two or three hours after micturition. This occurs during spell after every urination. Last attack has lasted four months, about same, not progressively worse; no opiate here, at home opiate. Suppository gr. 1-4 before urinating three times a day, none last four weeks. No frequency, no dysuria, no hematuria, no pain in either kidney region.

Physical findings: normal weight 140 lbs.; present weight 135 lbs.; duration loss wt. 6 months. S. B. P. 124. D. B. P. 80. Pulse 90. No fever. Few palpable glands right axilla. Ear, nose and throat examination negative except for tonsils (2). Urine: Spec. gr. 1027; pus cells (2). Blood: hemoglobin 70 per cent; leukocytes 8400. Wassermann negative. Phthalein 30 per cent. Blood urea nitrogen 13 milligrams per 100 c. c. Blood urea 28 milligrams per 100 c. c. K. U. B. negative. Cystoscopic examination: Obstruction left ureter—probably functionless left kidney.

Patent operated April 1, 1921: left vesiculitis. Left vesiculectomy. Left rectus incision. In exploration was unable to find the ureter but the seminal vesicle was many times larger than normal and definitely inflamed with a good many adhesions in this area. After searching for the ureter was unable to feel the kidney on the left side. The kidney on the right side felt about twice normal size. Removed seminal vesicle.

Discussion by Dr. Braasch: We thought of the possibility of ligature of ureter in herniotomy, also possibility of stone occluding the lower ureter. It followed one case of granulation tissue in bladder wall, regarded at operation as inoperable carcinoma. Patent lived and later passed stone and granulation tissue disappeared. We thought this might be a similar case. The vesicle was found on rectal examination. The case has several points of exceeding interest.

### 2. CASE 344470.

T. E. C., 48 years of age, married 35 years. Contracted gonorrhea 16 years ago. Tonsillectomy at 18 years. Influenza in 1890 and 1918. Two years ago began to pass bloody urine and had pain in the

head of penis at the end of urination. Remissions. At times has voided a considerable amount of blood; at other times just enough to be noticeable. Recently troubled with frequency. Had been cystoscoped 6 times in past 2 years. Nine days previous to his visit to our clinic he had an attack of acute retention for 2 hours with considerable pain. Passed bladder stone 17 days ago. Attacks of hematuria occurred once in 4 to 7 days and lasted about 2 days. Pain has remained about same throughout 2 years; seems referred to suprapubic area and with urination but usually of moderate degree except when he passed the stone 17 days ago, which he says was about one-half inch long and three-eighths inch thick. For 6 months past scarcely a day without some blood in urine. No chills, fever or sweats. Had been told he had an obstruction in left ureter.

Wassermann negative. Urinalysis negative with the exception of an occasional red blood cell, and pus 1-15 cells in the field. Combined phthalein test 330 c. c., 50 per cent return in 2 hours 15 minutes. X-ray of urinary tract negative. Cystoscopic report: left hematuria with obstruction at the meatus. Neoplasm? Stone? Radiogram: suspicious shadow lower left ureter. Evident neoplasm partially protruding from left meatus as unable to introduce catheter. No secretion apparent but bleeds easily on contact. Right kidney normal.

Diagnosis: left ureteral neoplasm; left renal neoplasm. Obstruction left meatus.

Operation January 10, 1921: Left nephrectomy for pyonephrosis, pyonephritis, with destruction of 80 per cent of the kidney substance. Kidney weighed 120 gms. and was full of pus. Partial subcapsular nephrectomy, ureter ligated and dropped back, with the recommendation that the ureter and piece of the bladder wall be removed later when patient's condition would permit.

Operation January 21, 1921: Left ureterectomy with resection of bladder wall, area size of silver dollar. Definite papillary epithelioma 8 cm. in diameter involving lower ureter. Ureter as large as a thumb throughout its entire course. Anterior extraperitoneal incision.

Discharged February 21, 1921 with wound healed and in good condition.

Dr. F. L. Adair, Minneapolis:

I wish to report two cases which are of no great interest in themselves but which illustrate the diagnostic possibilities of a method which I have tried out recently at the Minneapolis General Hospital. I fully realize that the procedure needs much more careful study before it can be definitely utilized. It seems to me that these two x-ray plates demonstrate definitely the possibilities of this method.

1. Minneapolis General Hospital, No. G-1980. Patient was about 3 months pregnant. She began to have vaginal bleeding and abdominal pain on February 6th. She passed a fetus about 2 days later and entered the hospital on February 12th where she

passed the afterbirth. She was discharged after several days with normal temperature and no bleeding. She returned to the hospital in a few days for bleeding. She was again sent home without bleeding. She returned again on March 22nd, flowing quite profusely. She was curetted and a perineorrhaphy done on April 2nd. She made an uneventful recovery. At the time of operation some iodoform gauze was inserted into the uterus which later the intern could not find. The x-ray plate was taken with the rectum and bladder filled with air, hoping that the gauze might possibly be located in the vagina or uterus. The record of the physical examination is as follows, so far as the internal genitalia are concerned: uterus retrocessed and acutely ante-flexed. It was pulled to the right of the midline and was freely movable. The x-ray plate, as you see, shows a shadow posterior to the right and lying rather high indenting the bladder on the right side. It lies high because the uterus was markedly retrocessed, the cervix resting almost on the sacrum, and because the x-rays were directed through the pelvis almost vertically to the plane of the inlet which projects the shadow rather high.

2. Minneapolis General Hospital, G-1685, was that of a young woman 23 years old. She was admitted to the hospital on March 9th with a yellowish vaginal discharge. She had pain in both lower quadrants of the abdomen. She had been treated during the previous two weeks for acute gonorrhea. On admission, the tubes on both sides were enlarged and tender. These masses enlarged somewhat and became firmer. She was treated by rest in bed with hot douches following which the masses in the tubal region progressively decreased in size. On the 10th of March bimanual examination showed the uterus acutely ante-flexed, not freely movable, in good anterior position in close proximity to the pubes. There was a small mass palpable in the left adnexal region, slightly tender. A larger mass about 4 or 5 cm. in diameter was palpable in the right adnexal region. On the day following, March 11th, x-ray examination was made following the distention of the bladder with air. The catheter was left in place in the bladder. The outline of the bladder is very definitely shown. You can see quite distinctly the shadow of the uterus with a low-lying adnexal mass on the right side.

Discussed by Dr. Dennis: These two cases show a very interesting development of the x-ray.

Dr. Farr: We have tried in the same individual the two schemes—dilating the rectum and bladder with air in comparison with pneumoperitoneum. Our impression was that we had better success with pneumoperitoneum in the cases in which it was used.

Dr. William Davis, St. Paul, gave a verbal report of a case recently seen at autopsy.

A man 65 years of age had been my patient for 35 years. An otherwise healthy man but gave a his-

tory of attacks of abdominal pain. His only severe illness occurred about the age of 25 (about 40 years ago) when patient was living in Philadelphia. During patient's lifetime he had almost nothing the matter with him except that he was always troubled with intestinal indigestion and a good deal of abdominal distress. No normal bowel movements, always numerous and explosive, and until last sickness patient never took a laxative. At autopsy the cecum was found bound by adhesions. On opening the cecum a stump about one-half inch long was found and near the stump was a cicatrix, evidently where there had been an ulcer in the bowel. It is rather an unusual thing for a case to show up in this way that was seen about 45 years ago by a member of this Academy (Dr. R. J. Hill). I had an opportunity to watch this patient through the greater part of his lifetime and had a chance to see the autopsy. An appendectomy done by Nature.

Discussed by Dr. R. J. Hill: Dr. Davis has given practically all I know about the case. When I first saw him he was suffering from perforated typhlitis. Two or three of the best physicians in Philadelphia were in attendance and gave up hope of his recovery. He finally made a very slow and tedious recovery, it being a month before the patient was out of danger. It only goes to show that we used to see cases of typhlitis and that they did not all die. It shows what Nature sometimes does if she is let alone.

Dr. A. C. Strachauer, Minneapolis, gave the following cases:

1. Gastrostomy under local anesthesia, for bleeding ulcer, upon greatly exsanguinated patient in extremis.

Louise K., age 36. Pain in epigastrium.

Appendectomy at 16 for questionable symptoms. Subsequent history one of irregular periods of epigastric distress coming on soon after eating. Slight food and soda relief. Relieved by vomiting. Has no trouble if on restricted diet.

Severe attack of epigastric pain March 5th, following meal, increasing in severity and with but transient soda relief. For 10 days was restricted to modified Sippy diet. March 15th had attack of syncope; later vomited a pint or more of dark blood. This was repeated a few hours later. Was very pale and weak. Patient was admitted to the medical service of the University Hospital on March 17th, 1921. Was given morphine in large quantities, ice-bag to epigastrium, enteroclysis; alkalies and thromboplastin administered by mouth. Patient vomited dark blood five different times while in hospital. Was transfused three times, and finally transferred to surgical service.

Temperature 97.2 degrees; pulse 145; hb. 20 per cent; respiration 24. Patient exsanguinated; mouth dry; restless; sighing respiration; skin dry, pale and cold.

Operation, March 31st, 1921, by Dr. Strachauer. Laparotomy under local anesthesia. Stomach de-



livered into wound; most carefully and thoroughly examined for ulcer. Gastro-hepatic omentum divided. Examining hand and fingers in lesser peritoneal cavity so as to thoroughly palpate the lesser curvature and posterior wall of the stomach. Duodenum negative for ulcer. A two or three inch gastrostomy incision longitudinally in the anterior wall of the stomach immediately proximal to the pylorus was made. The pylorus was relaxed and was normal. Upon requesting the patient to strain or cough, bile would be forced through the pylorus into the stomach. Examination of the interior of the stomach was carefully carried out. Upon sponging along the lesser curvature some 3 1-2 inches above the pylorus a clot was evidently dislodged from a vessel which began to spurt, a stream the size of an ordinary lead pencil for a distance of one-half to three-quarters of an inch. This blood vessel was at the margin of an ulcer the size of a coffee bean. This ulcer could not be felt upon palpation, even though it could be seen, proving that negative palpation of the stomach is not reliable in ruling out all ulcers. The ulcer and bleeding vessel were whipped over with interrupted linen and chromic sutures, and the gastrostomy closed.

On the third day the patient's condition was good; hgb. 32 per cent; temperature 98.6 per cent; pulse 120, and with the exception of a thrombophlebitis of the left femoral vein has made an uneventful recovery.

2. Juvenile tabes with gastrointestinal crises, misdiagnosed as acute appendicitis.

Blanche L., age 9 years.

Pain in right lower abdomen. March 12th, shortly after supper, patient complained of severe, cramp-like pain under right rib margin. This persisted for several hours, then disappeared, leaving a residual tenderness for the next 24 hours. No vomiting, no nausea, no chills, no fever. Four days later had another attack of greater severity than the first. Unable to lie on right side and unable to stand upright or walk because of pain. Patient was admitted to the University Hospital on the fifth day. Temperature 101, pulse 110; leucocytes 19,400; 81 per cent p. m. n.

Well nourished girl with flushed cheeks. Abdomen slightly distended and tense, with marked rigidity; more on right side. Marked by tenderness to deep pressure on right side. Marked and definite right psoas spasm. Rectal negative. Lungs negative.

Patient had snuffles. Circumscribed ulcerated area on palate.

Operation, March 17th, 1921, by Dr. A. A. Zierold, resident Surgical Fellow. Abdomen opened and explored. Entirely negative.

Subsequent neurological report: Colloid gold 0032210000. Sp. Wassermann+. Mother+. Pupils regular, sluggish in reaction; slightly unequal. K. J. and A. J. very sluggish. Deep muscular pain sense diminished, but present. No disturbance of vibration or position sense. Girdle sensory disturbance positive.

3. Man about 60 years of age in collapse and shock. Nothing in history of interest except extremely high blood pressure and nephritis. Perforated ulcer was considered. On opening abdomen, was found to have 11 feet of gangrenous bowel. This was removed, but unfortunately gangrene extended into jejunum and patient died after living for three days. I would like to know if any of you have had any similar experience and what would be the possibilities if this bowel had healed.

Dr. Corbett: Some experimental work has been done by Bernheim in closing off the bowel at this point and was ordinarily fatal in about 18 hours. Their conclusions were that closing the bowel at upper end, death resulted in about 18 hours; and closing at lower end, death resulted in from 3 to 4 days.

Dr. Dennis: I can add one case similar to Dr. Strachauer's first case. This was seen several years ago with Dr. Goodrich. At autopsy we were unable to find the ulcer. Finally after taking organs out and floating them in water we found the ulcer.

Dr. R. E. Farr, Minneapolis, reported two cases illustrating the use of pneumoperitoneum as an aid in making roentgen-ray diagnosis.

1. Man, age 35, with history that fitted very well a cholecystitis with attacks of biliary colic. In the film shown you will see on the right a shadow which at first was considered the gall bladder but which was later ruled out, and believed to be kidney. At top of that you see the much smaller tumor containing many gall-stones.

2. The second case illustrates the use of pneumoperitoneum in the lower abdomen. With patient in high Trendelenburg position and using pneumoperitoneum in lower abdomen we get a great deal of benefit in some cases.

This woman had a diagnosis of exophthalmic goitre made by me two years before. She was operated and made splendid recovery with the exception of one condition. She had angioneurotic edema, most marked that I have ever seen; looked something like a case of leprosy. While attacks improved somewhat they continued and we believed she had some disturbance of the endocrine system. She had a history of pain and soreness in lower abdomen for from 6 to 7 years. Bimanual examination was not made at the time of exophthalmic treatment as this phase of the disease was not gone into carefully. She returned two months ago on account of the condition in the lower abdomen. On examination we could feel a soft floating mass which was diagnosed as an ovarian cyst. There had been no disturbance of menstruation.

We did a pneumoperitoneum and made this plate. You can see the ovarian cyst running up to about the 2nd lumbar and in the central line you can see several small shadows. She had not had an enema, therefore we did not have the courage of our convictions and did not make an absolute diagnosis.

Considered diagnosis of ovarian cyst fibroid, or ovarian cyst dermoid.

Operation revealed right ovarian cyst and left ovarian dermoid.

**Dr. A. W. Dennis, St. Paul,** gave the following case report:

Woman about 30 years of age. Operated on two years ago for inguinal and infected right femoral hernia. About one year ago came complaining of severe pain in abdomen which came and disappeared and which had no relation with anything which was familiar. Patient was not relieved by different positions which usually help addominal pain. Examined with fluoroscope and no diagnosis made. Patient sought relief elsewhere. Later she came back to St. Paul, was fluoroscoped again and still no diagnosis made. For last 2 or 3 months patient had been quite comfortable. Day before yesterday I was sent for and I think I never saw a patient in such severe abdominal pain as she was. Gave 1/8 gr. morphine, then 1/6 gr. and another 1/6 gr, before she got any relief. Patient began vomiting later in day. Left hypochondriac region was about what would correspond to location of pain. Yesterday at noon a lump appeared in right side with slight soreness. Lump felt like something coming through the wall. This morning temperature went to 101, pulse 136, white count 23,000. Yesterday we attempted another fluoroscopy in the hospital but patient vomited the barium. This forenoon, following enema, she passed a large amount of blood. Made a diagnosis of intussusception.

At operation we found an intussusception which involved about 2 feet of ileum. (Specimen shown). We opened the cecum, resected the bowel through the cecum, put a tube through the union between the two small bowels and then closed the cecum.

I am not sure that this was the cause of her symptoms which she had had all this year, but I suspect that this is the cause.

toms which she had had all this year, but I suspect that this is the cause.

**Dr. C. W. More, Eveleth,** read a Thesis entitled "Some Practical Experience with Injuries with Special Reference to Fractures."\*

**Dr. E. M. Hammes, St. Paul,** read a paper entitled "Intracranial Telangiectasis,"\*\* with report of two cases.

Discussed by **Dr. H. P. Ritchie:** I am hardly prepared to discuss any of the general features of the situation. My experience is limited to this one case. There was no question but what the boy was in great distress and mentally he was the very picture of despondency and was willing to undergo any procedure offering even a minimum amount of relief.

The flap was turned down with the base to the ear and as this came off I had a real thrill. Extending through the dura was a distinct and definite cyst and we thought it could be readily eradicated. As we reached this dark colored area we found the dura was adherent, and then to add to our disappointment we found an enormous vein, much dilated and tortuous. It looked as though I had hardly room to tie it between the bone margin and the vein itself. I tied all the branches and in looking around this was the only vein I was able to demonstrate. The tying of the vein must be careful work but is quite easy to do, and so far as we could see was without injury to the brain substance. He went off the table with a fairly sizable decompression operation. The patient had a stormy recovery but the mental attitude and appearance of the fellow is most remarkably changed.

—HARRY P. RITCHIE,  
Secretary.

\*This paper with discussion will be published in Minnesota Medicine at a later date.

\*\*This paper will appear in Archives of Neurology and Psychiatry.

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## ORIGINAL ARTICLES

### EXPERIENCES WITH PNEUMOPERITONEAL X-RAY AS AN AID TO GYNECOLOGICAL DIAGNOSIS

(Preliminary Report)

REUBEN PETERSON, M. D.

*Ann Arbor, Michigan.*

and

JAMES G. VAN ZWALUWENBURG, M. D.

*Ann Arbor, Michigan.*

The studies which form the basis of this communication were undertaken at the University Hospital by Doctor James G. Van Zwaluwenburg, Professor of Roentgenology, and myself with the idea of improving gynecological diagnosis, if possible, by x-ray pictures of the normal and pathological pelvis. A careful review of the literature on pneumoperitoneum and the x-ray convinced us that with the proper precautions and with a careful technique gas could be introduced into the abdominal and pelvic cavities without danger to the patients. It only remained to select and carry out a technique suitable for our own clinic to give the necessary time to the study of the pelvic conditions clinically and the x-ray plates prior to the time when the patients were operated upon and the final diagnosis made.

At the outset it may be remarked that the gynecologist is handicapped at the start in his study of the x-ray plates. In comparison with workers in other fields of surgery, he is not often called upon to utilize the x-ray and without such experience he is not competent to interpret what may be valuable pictorial illustrations of lesions he has been able to make out by his routine pelvic examination. In fact, without the cooperation of an expert roentgenologist it would have

been utterly impossible for this work to have been carried on with any hope of success.

Inasmuch as our main efforts from the gynecological standpoint have been to improve pre-operative diagnosis, the following plan has been adopted and carried out in practically all the cases. After a complete history, the patient was subjected to a most careful and painstaking bimanual examination and the exact findings recorded. Whenever possible a clinical diagnosis was made from these findings and this in turn carefully recorded. The patient was then inflated with the gas and the x-ray plate or plates taken in the examining room in the manner to be later described. These plates were then read in the x-ray laboratory and the findings recorded without consultation with the clinician. Prior to examination under anesthesia and operation, however, the plates were carefully studied by Doctor Van Zwaluwenburg and myself with the idea of reconciling the recorded clinical and x-ray findings and discussing the diagnoses which in some cases were similar but in many instances were quite wide apart.

Prior to the operation the patient was subjected to a most careful examination under anesthesia and the results of this examination recorded. Care was taken to record only what was felt by bimanual touch, uninfluenced by the x-ray findings. For example, if the x-ray showed an adherent right tube and ovary unrevealed by examination under anesthesia, such a condition was not recorded.

As a final step in the study, the exact condition of the various pelvic organs was noted when the abdomen was opened and carefully described, so as to compare the actual pelvic conditions with the appearances of the x-ray plate. The removed pathological organs were photographed as nearly as possible as they lay in the pelvis and these photographs in turn studied in connection with the x-ray plates.

It must be borne in mind that this is a preliminary

\*Read before the Southern Minnesota Medical Association, Mankato, November, 1920.

nary report of a work which can not be said to be fairly started. In comparison with the thousands and tens of thousands of gastro-intestinal x-ray examinations and the opportunities for the study of such plates and the conclusions to be drawn therefrom, our work with its small number of cases furnishes insufficient data from which to draw conclusions. However, this much may be stated. Starting as an experiment and a rather doubtful experiment at that, the clinicians now would relinquish only with the utmost regret this most important and interesting aid to gynecological diagnosis. The more our studies have been pursued, the more enthusiastic have we become.

Another advantage of this combined diagnostic endeavor has been the marked improvement in the carefulness with which the clinical examination and diagnosis are made by all members of the staff. It is no longer considered good form in the clinic to state there is a "mass" to one or the other side of the uterus, especially when one knows that the x-ray may unravel this "mass" and make of it an enlarged tube with a comparatively normal ovary. The outstanding feature of the combination of carefully recorded clinical examinations and x-ray pictures of the pelvis is the tendency to do away with slipshod methods. No longer will it do to state that the pelvis is tender on bimanual examination and contains something, just what will be ascertained when the abdomen is opened. The results of the examination may be wrong or only partially correct, but at least they bear the ear marks of an attempt to make a diagnosis and in this way win the respect of the x-ray department which is not afraid to record its deductions drawn from careful study of the plates.

As the purpose of this communication is to show by lantern slides what has been accomplished by pneumoperitoneal x-ray as an aid to pelvic diagnosis, I will content myself with giving you a summary of our present technique, which is far different from that employed in our first investigations.

We use carbon dioxide gas in preference to oxygen. The reasons for changing to this gas were that the discomfort to the patient of distending the abdomen enough to separate the soft tissues, pelvic and abdominal, and sufficient to

give the best x-ray plates, was greater and more persistent when oxygen was employed. Oxygen is but slowly absorbed by the peritoneum with the result that the patient may be distressed for hours and at times for a day or two.

When carbon dioxide gas is used, while the distress in proportion to the amount used is just as great as with oxygen, the discomfort is very temporary, the gas being absorbed within fifteen minutes to half an hour after the inflation. This quick absorption is disadvantageous in another way since it necessitates exceedingly rapid work in plate taking. Delay with the x-ray apparatus may mean failure even if a liter or more of the gas has been introduced. Patients are able to walk to the ward or out of the hospital without discomfort within half an hour after the inflation.

In our experience with nearly one hundred inflations of either oxygen or carbon dioxide gas into the abdominal cavity either by the transuterine or transperitoneal route, no signs of peritoneal irritation produced by the gas have been observed. This coincides with the experience of Stein and Stewart and other workers in this field.

For obvious reasons no inflation should be performed in acute abdominal or pelvic conditions. Failure to observe ordinary precaution in this regard may give rise to acute flare-ups, just as we see an elevation of temperature after thorough bimanual examinations of patients with acute or subacute pelvic inflammatory conditions.

The needle used for transperitoneal inflation is the one commonly employed for spinal puncture. The site of the puncture is just below the umbilicus and in the median line unless such site is contraindicated by probable bowel adhesions at this point. No intestines have been perforated.

Schleich's solution is used for the skin and underlying tissues down to the fasciaprior to the passage of the needle.

The needle is passed only a short distance through the peritoneum. Its passage through the latter can be detected after a little experience. If there be any difficulty in the passage of the gas through the needle it is easily overcome by having the patient take a few long breaths.



The amount of gas at an inflation should be accurately measured by a gasometer and the pressure estimated by a manometer. The apparatus employed is almost identical with that utilized by Rubin for transuterine inflation of the pelvic cavity by way of the fallopian tubes. Instead of the crude estimation of the amount inflated by means of the rubber bag advocated by Stein and Stewart and others, the flow of gas can be regulated from the tank by the number of excursions of the gasometer and the amount of gas passing at each excursion. The greater the number of excursions, the more rapidly the gas is passing and the higher the pressure if there be the same resistance to the passage of the gas.

To insure success of the x-ray plate of pelvic organs the patient must be so placed as to allow the gas to rise upward and displace the pelvic organs and force the intestinal coils out of the pelvis. After many trials with different positions we are securing the best results from the moderate knee chest position with an inclined board beneath the thighs with a notch cut out for the pubes. The table is then tipped as for the Trendelenburg position and the patient prevented from slipping by shoulder straps.

"An 18 inch square of opaque fabric with a 6.5 inch circular hole cut out of its center is laid on the buttocks and serves as a diaphragm. A plate changing tunnel is then placed horizontally on the table, double screen films are used, and a Coolidge portable unit, operating in the ordinary lamp circuit furnishes the x-ray. An exposure of from fourteen to twenty seconds is required and ordinarily each exposure is interrupted, being made at such intervals as the breath can be held conveniently and the patient allowed to breathe between the fractional exposures."

As a routine procedure in suitable cases the transuterine method of inflation is attempted first, and if the tubes be found permeable, from a liter to a liter and a half of gas is allowed to pass into the abdominal cavity through the uterine cannula. If the tubes are impermeable to a pressure of 200 millimeters the cannula is withdrawn and the inflation brought about by the transperitoneal route. Naturally there will be far from a few cases where for various reasons it will be preferable to choose the transperitoneal

route at the outset. However, in our experience, as well as that of Rubin with over one hundred cases of inflation by the transuterine route, the theoretical danger of forcing infectious material from the tubes into the pelvic cavity does not exist. However, this will be discussed at some length in a subsequent paper.

Just as Rubin has found that smaller and smaller amounts of gas can be demonstrated by the fluoroscope and the x-ray after transuterine inflation, 150 cubic centimeters usually being sufficient, so are we convinced that good x-ray results will be obtained by smaller and smaller quantities of gas. A correct position such as already described will give a good plate with from 500 to 1000 cubic centimeters of gas, whereas with a faulty position 2 or 3 liters may be necessary. Other things being equal, since the ordinary patient does not begin to suffer discomfort or even feel the effects of the inflation until about 500 cubic centimeters have been introduced, it should be the aim to so manage the technique that the inflation will not go beyond this quantity and possibly fall short of it.

After the lantern slides I ask to be permitted to summarize what has been accomplished thus far by the combined clinical and x-ray study of pelvic lesions.

1. The normal uterus together with tubes and ovaries can be clearly demonstrated by the pneumoperitoneal x-ray plate.

2. Owing to the distension with gas the tubes are rather more clearly demonstrated where the inflation has taken place through the uterus than transperitoneally.

3. Irregularities of the uterus are quite as fully, if not more clearly, shown by the x-ray than made out by bimanual examination.

4. With the improved position (knee chest and Trendelenburg) the pelvis will be shown clear of bowel coils. Retention of such coils in the pelvis will be proof that intestinal adhesions are present.

5. In not a few instances the diseased and enlarged appendages are more clearly outlined by the x-ray than can be made out by the most careful and searching bimanual examinations.

6. In certain cases of flaccid tubes or where the tubes are plastered against the pelvic walls by adhesions, the x-ray is more valuable than bimanual examination as regards diagnosis.

7. It is not beyond the range of possibility that with improved technique and experience, early cases of pregnancy can be definitely determined by the x-ray before such a procedure is possible by the examining finger.

8. The above are not conclusions but suggestions to be considered in connection with the subject under discussion. Further experience may change our views.

9. In conclusion the bimanual examination and x-ray plate after inflation of the pelvis by gas, are not antagonistic methods of diagnosis. They are each valuable and their value is enhanced if they are used in conjunction, each acting as a check upon the other.

#### DISCUSSION

DR. JENNINGS C. LITZENBERG, Minneapolis: I hesitate to discuss a subject concerning which I know nothing, but that great American letter writer, Dr. Schmitt, of Mankato, wrote me after I had refused to discuss the paper on the ground that I had had no experience with the procedure, so I had to yield to his importunities and convincing arguments.

Seriously speaking, there is one phase of this paper about which I am an authority, and that is mistakes in diagnosis in plevic examinations as revealed at the operating table.

I forgot to add in my preliminary remarks that before I consented to discuss the paper I wrote to Dr. Peterson and asked him if he would send his conclusions, and perhaps a copy of his paper so that I could study and discuss it. He replied, "All I know about the subject is contained in the abstract in the program." I thought that if he did not know any more than that about the subject, I probably could discuss it. (Laughter.)

I share with you, I am sure, the enthusiasm manifested after listening to Dr. Peterson's paper, because we have an opportunity offered to us for improving our diagnosis. If there is anything the true physician ought to hail, it is an addition to his accuracy in diagnosis, for we make enough mistakes after we think we are skilled.

We hear teachers of gynecology say to the students (I have done it myself), "educate your fingers so that you will have eyes in the ends of them." I have found difficulty in getting the eyes in those fingers to converge. After making thousands of examinations a man thinks that he can make a diagnosis only to find at the time of operation that his diagnosis was wrong.

I met in the halls of the university a student who was coming from the gynecological clinic. After having had an hour or two there he was full of enthusiasm for he had made a diagnosis. After having tried to feel something in the pelvis, he finally had found the uterus. (Laughter.) Meeting him in the hall he could not restrain his enthusiasm and he

said, "Doctor, I just had the greatest day of my life at the clinic; I palpated the uterus." (Laughter). I made the remark that it takes a long time to educate the fingers to know what one feels in the pelvis, and the student replied, "Yes, doctor, it took me a long time." (Laughter.)

When I saw these roentgenograms of Dr. Peterson's and realized that we have another aid to overcome these now inevitable mistakes I was impressed, because these mistakes as related by Dr. Peterson are by men who have been at the game for thirty years, men who, if the things could be felt, could feel them. Now that we have another aid we ought to hail it with enthusiasm.

I have hesitated more on account of skepticism than anything else about the safety of this procedure. I am convinced, after what Dr. Peterson has said. I have read some of the other papers on the procedure, and I have been a little skeptical knowing that fluids have been injected into the uterus, have gone into the tube, and septic material might produce bad results. But if we get bad results in a few cases, as probably we may, a procedure that will reveal things like the last picture has shown, is certainly of value. I believe that we have here a procedure which we must all try out if it only gives us a little aid.

A few years ago we depended upon the x-ray to tell us absolutely what was the matter. We know now the x-ray does not tell us absolutely about a fracture, but nevertheless the x-ray has gained in value in every field, and it has been our regret that it has not been of more value in our field, and if we could try it out commonly, I am sure it will be a great aid to our diagnoses, and certainly we need it in the pelvis.

DR. R. E. FARR, Minneapolis: I regret that I did not hear the first part of Dr. Peterson's paper. For some time past I have been doing pneumoperitoneums and I want to discuss two or three points. The injection through the uterus may have certain advantages and is probably safe, providing the proper precautions are taken. Of course, one gets the same results by making the injection through the abdominal wall, aside from the evidence in relation to the tubes. The work under local anesthesia shows that the needle may be introduced repeatedly into the peritoneal cavity without causing any harm. The point of injection should be anesthetized with local anesthesia and deflation should be made through the same point, if it is thought desirable. We first used oxygen and found that, after 36 hours or two days, when we opened the abdomen there would be a considerable amount of gas present. Carbon dioxide is absorbed much more readily. The pneumatic injector is used by us for producing pneumoperitoneum, employing the following technic: 1 cylinder is first filled with sterile water and then evacuated by pressure from the oxygen or carbon dioxide tank. This gives us a glass cylinder filled with filtered gas. The injection is directly under control of the cut-off and may be made under any pressure desired.



DR. PETERSON (closing the discussion): I have very little to say in closing. What Dr. Litzenberg said about the medical student reminds me of one of my students in a short course we were giving in gynecologic diagnosis. I had this man come down to examine the pelvis, and after he had made a careful examination I asked him what he had found, and he replied, "I found a tubercle bacillus on the left ovary."

I can only remark that when you begin this work you can feel more than you can after some thirty years' experience.

We started out by using the bag as advocated by Stein and Stewart, but we are not satisfied with it, because we could not tell how much gas was passing into the peritoneal cavity except in a general way. With a bag that holds three liters, held between the knees of an assistant, pressure enough can be exerted to force gas into the abdominal cavity. But it was a rather rough method of estimating how much gas is passing into the cavity. The apparatus we use now is not at all complicated. With Rubin's apparatus, we have an accurate estimate of how much gas is passing, and we can tell under what pressure it is passing. This is also necessary where you are passing gas through the uterus and tubes. In some experiments I have conducted with the uterus and tubes after removal, I found that 250 or 300 millimeters of pressure could be used without rupture, but in order to be on the safe side, one does not want to pass gas under that pressure. We have found that if the gas will pass through the tubes it will pass under a pressure of 200 millimeters. We have tried this with the patient under the anesthetic at the operation, and we have demonstrated how much pressure is necessary very satisfactorily. If one will try the apparatus we are using now I think he will not go back to the gas bag advocated by Stein and Stewart.

I was interested in what Dr. Farr said relative to the pneumatic injector, and I would like to try that out in connection with our apparatus. As I stated in my paper, the method is simply on trial. It is something to improve our diagnoses if we can. We are doing it under the greatest precautions. I think after a year or two years or maybe three years we will be able to show things in the pelvis prior to operation that are not possible now and that we never dreamed of seeing before. If we can do that, we will be amply repaid for the time we have devoted to this work.

## THE RELATION OF NASOPHARYNGEAL MALIGNANCY TO OTHER DIAGNOSIS\*

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I have been impressed with the lack of nasal symptoms in some of the cases of malignant disease of the nasopharynx and the frequency with which such growths have been overlooked in the patients who come to the Clinic for diagnosis. These malignant tumors include sarcoma and epitheliomas but not the fibromas and myxomas. The patient's complaint may be pain in the ear or over the face and head, gradual loss of hearing, drooping eyelid, seeing double, nasal obstruction, or an enlarged gland of the neck. Very often general examinations, including those of the eye, ear, nose, and throat, and in some cases the neurologic examinations, have been made, but the very small malignant growth usually high in the vault or lateral wall of the nasopharynx above the eustachian tube has been overlooked. In order to emphasize the importance of a very careful examination of the nasopharynx in cases in which tumor in this region might be the cause of the patient's symptoms, I am reviewing the symptomatology of forty-six malignant tumors of the nasopharynx which I have examined at the Mayo Clinic during the last four years (1915 to 1919).

### TYPE OF TUMOR

|   | Cases |
|---|-------|
| Epithelioma .....                             | 22    |
| Sarcoma .....                                 | 14    |
| Malignant (type of cell not determined) ..... | 7     |
| No pathology .....                            | 3     |

46

### AGE OF PATIENTS

|                      |    |
|----------------------|----|
| 10 to 20 years ..... | 9  |
| 21 to 30 years ..... | 3  |
| 31 to 40 years ..... | 8  |
| 41 to 50 years ..... | 11 |
| 51 to 60 years ..... | 12 |
| 61 to 70 years ..... | 3  |

46

|                       |    |
|-----------------------|----|
| Age of oldest .....   | 66 |
| Age of youngest ..... | 5  |

|               |    |
|---------------|----|
| Males .....   | 38 |
| Females ..... | 8  |

Fifty per cent of malignant tumors of the nasopharynx occurred between the ages of 41 and 60. A review of the histories does not furnish any tie-

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ologic factor or factors that might determine the cause of these tumors.

The symptoms varied in duration from five weeks to three years; they were pain, symptoms of the eye, symptoms of the ear, symptoms of the nose and nasopharynx, enlarged glands of the neck, and intracranial symptoms.

Seventeen only of the forty-six patients complained of pain, which varied from an ear-ache to a very severe pain, as if a hot iron were burning into the head. The pain was always on the affected side, extending over the frontal, temporal, and mastoid regions and down the neck. One patient complained of very severe pain just underneath the angle of the jaw, but usually it was diffuse and radiating over the head. In cases in which the gasserian ganglion or the second and third divisions of the fifth nerve were involved by direct extension of the tumor, sharp pain, similar to that in trifacial neuralgia, occurred and later numbness over this area. Dull constant headache was complained of in some cases.

One patient with an epithelioma of the nasopharynx had had a wisdom tooth removed from the upper jaw on account of a sharp shooting pain. This was the first symptom; later the pain was dull, and at the time the patient came for examination there was numbness over the face and temporal region. Some patients attribute the pain in the head to the enlargement of the glands of the neck and believe the pain over the head to be referred from the neck.

One patient complained of constant frontal and temporal headache on the right side and an enlarged gland in the neck for a year. He gave a positive history of lues, for which he had received specific treatment elsewhere. Since the pain was relieved temporarily, the treatment was continued. The patient had an epithelioma of the nasopharynx with gland involvement.

Ten patients had eye symptoms at the time of examination; the most common was drooping of the upper lid or seeing double, following an aching of the face for several months. One patient had a complete fixation of the eye with a ptosis of the upper eyelid caused by the direct extension of an epithelioma of the nasopharynx. One patient's chief complaint was dimness of vision, drooping of the upper eyelid, and numbness of the right side of the face; this had been coming on gradually for two years.

Eleven patients complained of their ears at the

time of examination. One patient complained of fullness in the ear and back of it and slight deafness. One had had an inflammatory condition of the ear fifteen months before examination. Paracentesis had been done which had brought temporary relief. A septum operation was performed later, but the ear gradually became deaf. An epithelioma was found around and involving the eustachian tube. Gradually increasing deafness preceded by ringing and noises in the ear with earache at times was the complaint in one case.

Twenty-four patients had nasal and nasopharyngeal symptoms at the time of the examination other than the ear symptoms or pain. In nineteen of these, the complaint was nasal obstruction; in three, recurring attacks of bleeding; and in two, increasing nasal discharge. It is a surprising fact that there were nasal or nasopharyngeal symptoms in only twenty-four of the forty-six cases of malignancy of the nasopharynx. This was due to the locations and the superficial character of some of the growths, which appear in the vault or laterally in the nasopharynx above or involving the eustachian tube, and may be slow growing and of a very low type of malignancy. They are sometimes a flattened ulceration with a thickened border similar to that of the basal-cell epithelioma of the face. This may be true of the epithelioma or of the sarcoma. The sarcomas may fill the nasopharynx or pharynx and bulge the palate, causing dysphagia and dyspnea.

Thirty-two of the patients had enlarged glands of the cervical region at the time of examination. Eleven of these had operations elsewhere for glands of the neck, varying from excision of a single gland to a block dissection, without the primary focus being found. Three of these patients had had a microscopic diagnosis of endothelioma of the gland which was removed because a primary epithelioma was not found.

A clinical diagnosis of Hodgkin's disease was made elsewhere in three cases. Metastasis in the neck may be extensive from a small primary growth in the nasopharynx. Sometimes a huge mass in the neck may be present when the primary growth in the Rosenmüller fossa is not more than 1.25 cm. in diameter. The first gland involved in malignancy of the nasopharynx is usually high in the cervical region. Both sides of the neck may be involved.

Nine patients had had tonsillectomy because of enlarged glands of the neck, and four had had



teeth removed. Six had nasal operations, apparently without the discovery of malignant growth of the nasopharynx.

Three patients were treated for lues because they gave a positive Wassermann or a history of luetic infection. Two of these had lymphosarcomas from which the pathologist had examined a specimen for diagnosis and reported inflammatory tissue. Because of this luetic treatment was instituted and a diagnosis of gumma made. One or two negative reports on tissue removed from a possible lymphosarcoma of the nasopharynx or the pharynx should not be accepted as definite if the condition looks malignant as it is only by repeated examination of specimens in these conditions, especially in rapidly growing tumors, that the pathologist is able to make a definite diagnosis of lymphosarcoma.

One patient who had an epithelioma of the nasopharynx was referred to the Clinic to have the posterior root of the gasserian ganglion cut for trifacial neuralgia. The growth had perforated through the skull and involved the gasserian ganglion and caused the symptoms (Case 205751).

One patient was operated on for pituitary tumor. The patient died and at necropsy the tumor was found to be a direct extension from a very active squamous-cell epithelioma of the nasopharynx that had perforated through the skull into the sella turcica.

One patient complained of dimness of vision, ptosis of the right upper eyelid, and numbness of the right side of the head. Examination of the eye suggested an intracranial disorder (Case 246500).

#### SUMMARY

A study of the cases of malignant tumors of the nasopharynx shows that the symptomatology is variable and that in some cases of malignant glands of the neck the primary growth can be found only by a very careful examination of the nasopharynx. A tumor thought to be an endothelioma may have a primary growth in the nasopharynx. Patients with neurologic eye and ear symptoms in whom a nasopharyngeal growth may be the cause, should have nasopharyngeal examination.

#### CASE REPORTS

##### ADENOCARCINOMA OF THE NASOPHARYNX INVOLVING THE ORBIT

Case 246500. Mrs. F. E. S., aged 36, was examined Sept. 23, 1918, because of dimness of vision of the right eye, numbness of the right side of the head, and ptosis of the right upper eyelid. The trouble had started two years and three months before, when she noticed ptosis of the right eyelid.

this gradually became worse. A nasal operation was performed for the trouble and the patient thought she was somewhat improved. She had had a dull headache on the right side for the last six weeks. About four weeks before the examination she fell over a trunk, striking on the knee and head, and after that a small clot of blood had come from the back of the nose every morning. She had a feeling of numbness of the right side of the head and face and the right ear seemed stuffy and somewhat deaf. She also had earache at times.

The patient was 5 feet 6 inches tall. Her normal weight was 187 pounds, but at that time of examination she weighed 110.5 pounds; the loss has occurred in the last six months. The patient appeared to be well nourished. Examination showed ptosis of the right eyelid and palpable glands in the right cervical region. With the right eye the patient could detect moving objects; vision in the left eye was 6/4; the pupils were unequal. Both eyes reacted to direct and consensual light promptly and equally; the right was sluggish to accommodation. Proposis of the right eye was 3 mm., and the eye could not be closed completely. The right pupil did not dilate with cocaine but dilated with homatropin. The right field showed central scotoma, smaller for larger test objects. The extra-ocular muscles were not involved. The ciliary muscle was active, suggesting intracranial disorder. The right optic nerve was atrophic. In the nasopharynx on the right side was an ulcerated area about 2.5 cm. in diameter.

The microscopic diagnosis was adenocarcinoma.

##### EPITHELIOMA OF THE NASOPHARYNX WITH METASTASIS TO THE CERVICAL GLANDS

Case 240626. Mr. T. A. M., aged 52, who was examined July 31, 1918, came because of recurring enlarged glands of the neck. The patient had been in good health until November, 1917, when he had an inflammatory condition of the ear. His earache was relieved by paracentesis. One month later a gland in the right cervical region became enlarged. In May, 1919, a surgeon removed the glands from the right side of the neck; epithelioma was diagnosed. No primary focus could be found. The tissue from the glands of the neck was sent to a pathologist and the diagnosis "endothelioma" returned. July, 1919, a second operation was performed for recurring enlargement of the glands of the right submaxillary region. Three weeks later another small gland was removed and Coolidge-tube treatment used. For seven months before examination a gland in the right cervical region gradually had been getting larger. The patient had not lost weight and had no general complaint.

The patient had scars on the right side of the neck from a previous operation and a scarred fixed mass about 6 cm. in diameter high over the right cervical region. Examination of the nasopharynx revealed a growth about 2.5 cm. in diameter of the left nasopharynx and eustachian tube. Tissue removed for diagnosis showed epithelioma.

##### EPITHELIOMA OF THE NASOPHARYNX INVOLVING THE GASSERIAN GANGLION, THE ORBIT, AND THE CERVICAL GLANDS

Case 305751. A man, aged 64, registered at the Clinic Feb. 9, 1920; he was referred here by a physician for cutting of the posterior root of the gasserian ganglion for trifacial neuralgia. The patient's complaint began three years before examination as pain in the right ear with gradually increasing deafness. At first the pain came at intervals, but soon became continuous and extended over the right mastoid region and the right lower jaw and cheek. It was dull, aching, and constant, and was relieved by the use of aspirin. There had been a gradually increasing

obstruction of the right side of the nose which the patient attributed to a catarrhal condition which he had for many years.

One year before examination the patient had a deep alcohol injection of the second and third divisions of the fifth nerve; this did not give relief. He was then referred to a neurologist, who said that the lesion was central and advised the use of potassium iodid and massive doses of arsenic. No improvement followed this treatment. One month later an ulcer developed on the cornea of the right eye, and the lids of this eye were sutured together and the eye treated. Although the Wassermann test was repeatedly negative, the patient was given two injections of arsphenamin in August, 1919, with no improvement in his condition.

At the time the patient presented himself at the Clinic for examination, the pain extended over the right mastoid region, the temporal region, the lower jaw and cheek, and the frontal region on both sides. For the last few weeks the pain had so increased in severity that it was only relieved by the use of morphin.

Examination revealed partial obstruction of the right nostril by a polyp. It was impossible to examine the nasopharynx thoroughly by the routine method, but by the use of 10 per cent cocain and a retractor to draw forward the soft palate a more thorough examination was made. An area of ulceration 2 cm. in diameter was found in the right nasopharynx just above and involving the eustachian tube. The lesion was clinically malignant. Two firm glands, 2.2 cm. and 1 cm., respectively, in diameter, were found in the right cervical and submaxillary region. The roentgenogram showed a tumor mass extending from the region of the right nasopharynx up through the base of the skull. Examination of the eye showed a corneal opacity in the right eye, due to an old ulcer. The lids of this eye were adherent over the outer two-thirds of the palpebral fissure as a result of previous treatment. The patient was completely deaf in the right ear. The neurologist reported right gasserian ganglion involvement from extension of nasopharyngeal tumor.

The pathologist's diagnosis of a specimen taken from the ulceration in the nasopharynx was squamous-cell epithelioma.

#### EPITHELIOMA OF THE NASOPHARYNX INVOLVING THE SELLA TURCICA

Case 216363. Mr. F. A. A., aged 33, was examined Dec. 11, 1917, for blindness in the right eye, stiffness of the neck, and headaches. The blindness had started in 1914. Within six months sight in the right eye had entirely disappeared. During this time he had some headache which usually came on in the evening. Up to three weeks before examination he had no discomfort and could see well with the left eye. He had a slight headache, vomited, and fell unconscious to the floor, remaining unconscious for an hour. The pain in the neck lasted until November, 1917, when the patient consulted a physician in Chicago, who did a lumbar puncture; the pain left suddenly and the patient felt reasonably well.

This patient had a neurologic examination, and diagnosis of a pituitary tumor was made. At the time of operation a tumor 2 cm. in diameter was snared out. The patient died following the operation. Post-mortem examination revealed a large nasopharyngeal neoplasm growing up into the base of the skull and destroying the sella turcica. The pathologist's report was squamous-cell epithelioma.

#### EPITHELIOMA OF THE NASOPHARYNX WITH INVOLVEMENT OF THE THIRD AND SIXTH NERVES

Case 179436. Mr. R. J., aged 66, examined Dec. 4, 1916, came to the Clinic because of pain in the left side of the face and ptosis of the left upper lid. The

ptosis was first noticed three months previously after the patient fell out of a buggy and injured the right side of the head. He got up again and drove four miles before he began to feel dizzy and left eyelid drooped. Following the accident pain persisted in the left side of the face and around the left ear. About the same time the patient noticed enlarged glands in both sides of the neck just below the ear. He had a severe cough the last three months, and at times some bleeding from the left nostril.

The patient was 5 feet 6 inches tall, poorly nourished, and weighed only 126 pounds; his normal weight was 150 pounds. Hard glands were palpable in the left submaxillary region and in the left cervical region. A gland in the left submaxillary region was also palpable. The left upper lid was ptotic and the left external rectus muscle paralyzed. A roentgenogram of the chest was negative. The Wassermann test was negative. Examination of the nasopharynx revealed an epithelioma on the left side of the nasopharynx with slight bulging of the soft palate.

### DIAGNOSIS AND INDICATIONS FOR OPERATION IN ACUTE MASTOIDITIS\*

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The diagnosis of acute mastoiditis may be exceedingly simple when the case presents the classical signs and symptoms of an acute mastoid involvement, with external changes over the region of the mastoid process, or the diagnostic signs and evidence of pathological changes within the mastoid antrum and cells may be so obscure as to make the diagnosis somewhat difficult. It is the latter class of cases that is sometimes overlooked and neglected, and the patient thereby subjected to the grave dangers of an intracranial complication or to the serious sequels of a chronic purulent otitis media resulting in marked permanent functional impairment of the middle ear.

A considerable proportion of cases of mastoid involvement do not present at any time the usual signs and symptoms of a mastoiditis, and it has been the experience of every aural surgeon to have operated many cases in which the direct signs of a mastoiditis have been obscure and to have found most extensive pathological changes present which, if not relieved by surgical measures, would have resulted in serious complications in a high percentage of cases. The absence of well known and easily recognized signs of mastoiditis is more likely to occur in adult cases than in children, and on account of the anatomical conditions present in

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the mastoid process in adult life, these masked cases of mastoid abscess assume a greater importance, and intracranial complications are more frequent, and delay in recognizing the indications for operation is more dangerous.

This becomes apparent when we consider the anatomy of the middle ear and mastoid in children and adults and the pathology of an acute middle ear infection. During childhood the mastoid cortex is thin and less resistant to pressure from within. Infection is transmitted more readily through the cortex, periostitis and subperiosteal abscess are more likely to occur, and the presence of a patent squamomastoid suture, which is likely to be present until the age of two years and sometimes considerably later, serves as a pathway for the transmission of infection from the antrum to the cortex. In adult life and especially with advanced age, the mastoid cortex becomes hard and resistant due to osteosclerotic changes which occur, and unless there is free drainage from all the involved cells and antrum into the tympanic cavity and from the tympanic cavity through the membrana tympani, the infection is likely to extend in other directions than through the cortex and cause intracranial complications.

On account of the close anatomical relationship between the antrum and the tympanic cavity, it is doubtful if the antrum escapes infection in any severe acute purulent otitis media, and if we consider the antrum as a part of the middle ear, the presence of the classical signs of mastoiditis such as temperature, pain, tenderness, discharge and external changes over the mastoid bone, do not necessarily indicate a mastoiditis, at least they may not constitute an indication for operation. Such symptoms, including redness and swelling of the soft tissues over the mastoid, may be present early in the course of an acute purulent otitis media, especially in children, before drainage has taken place, through the drumhead. Free incision of the membrana tympani, with establishment of drainage, may result in the rapid subsidence of all or recurrences of these symptoms after drainage has been obtained from the middle ear that is of diagnostic importance and becomes an indication for operation.

In order to draw some conclusions as to the relative frequency of the various symptoms and objective signs of acute mastoiditis, I have reviewed one hundred operated cases. The ages

were from three months to eighty-four years, and on account of the frequent different clinical manifestations of acute mastoiditis in children and adults, I have divided the cases into two groups: one group varying in age from three months to fifteen years and a second group from sixteen to eighty-four years inclusive. The symptoms tabulated were present at the time of operation, after free drainage had been obtained through the membrana tympani, and had persisted or recurred to such a degree as to present indications for operation. In all cases pathological changes were found within the mastoid indicating the necessity for operation.

|                                | 3 mos.-15 yrs. | 16-84 yrs. |
|--------------------------------|----------------|------------|
| Temperature .....              | 93.5%          | 76%        |
| Pain .....                     | 21.8%          | 68%        |
| Tenderness .....               | 96%            | 93.5%      |
| External Mastoid Changes ..... | 54.3%          | 40.2%      |
| Auditory Canal .....           | 33.3%          | 42%        |
| Discharge .....                | 93.5%          | 96%        |
| Streptococci .....             | 52.4%          | 58.8%      |
| Pneumococci .....              | 19%            | 26.5%      |
| Staphylococci .....            | 28.6%          | 14.7%      |
| Complications .....            | 13%            | 24%        |

Temperature varies greatly as a symptom of acute mastoiditis and when present, is usually of low degree, especially in adult cases. In the above series of cases it was present in children in 93.5 per cent and in adults in 76 per cent of the cases. It should be remembered that some cases of acute mastoid involvement do not show any temperature and the absence of temperature should not be taken as an indication that an acute mastoiditis is not present. In uncomplicated cases of acute mastoiditis in adults, temperature is seldom high and frequently drops to normal on the establishment of free drainage by incision or rupture of the membrana tympani. In children, temperature is in general higher than in adults, but extensive involvement of the mastoid may be present without temperature if drainage is free. A recurrence of temperature, with free tympanic drainage, is an important sign of extension of mastoid involvement, and a persistent low temperature, provided drainage is free and no other cause for temperature is present, may be the only apparent indication for operation.

Pain is a very variable symptom and in uncomplicated case of acute mastoiditis with free drainage from the mastoid cavities into the tympanum and from the tympanum into the external canal, it is not likely to be a prominent symptom, and extensive involvement of the mastoid process may be present, without the patient complaining of pain. The continuance of pain, however, after free drainage has been obtained through the drumhead,

is an indication that the mastoid is involved and that there is not free drainage between the areas of infection in the mastoid and the tympanic cavity, due probably to swelling of the mucous membrane lining the aditus ad antrum or the communications between the antrum and cells, thus blocking drainage. The occurrence of pain on cessation or diminution of discharge from the middle ear is also an indication of mastoid involvement unless the cessation of discharge is due to a sudden closure of the opening in the membrana tympani. The absence of pain is, therefore, not an indication that a mastoiditis is not present, and the presence of pain, especially after drainage has been obtained, is an indication that there is some mastoid involvement, and if it persists or increases in severity after 24 to 48 hours the mastoid should be opened. In the series of cases reviewed, pain was present in 21.8 per cent of the cases in children and in 68 per cent of adult cases.

Tenderness is a symptom that is much more commonly present and is probably the most reliable of all subjective symptoms of acute mastoiditis, as nearly all cases will show some tenderness over some area of the mastoid.

The type of mastoid with which we have to deal will influence to a considerable extent the degree of tenderness present. In the pneumatic type with well developed cells and a comparatively thin cortex, the tenderness may be pronounced, while in mastoids with a thick, hard cortex, tenderness may not be elicited except by very firm pressure and in some cases it is absent entirely.

The value of tenderness as a diagnostic sign will depend upon the time which has elapsed since the onset of the acute otitis media, upon the presence or absence of free drainage from the tympanum, upon the location of the point of tenderness and whether or not the tenderness is a recurring one. During the early course of an acute otitis media, and especially before rupture or incision of the membrana tympani, tenderness can almost always be elicited by pressure on the tip of the mastoid and sometimes by pressure over the antrum. Tenderness at this stage of the middle ear infection, in the absence of other signs denoting mastoid involvement, is not an indication of acute mastoiditis and will probably rapidly disappear on obtaining free tympanic drainage by incising the drumhead. If tenderness persists for 48 hours, or increases, after incision of the drumhead with free drainage, it is an indication that the mastoid

cells are involved and the safest procedure will be to obtain drainage externally through the mastoid process.

The location of the tenderness is of some importance. When located over the antrum or along the posterior portion of the mastoid process, it is more indicative of mastoiditis than when located at the tip.

Recurring tenderness is highly significant of acute mastoiditis. In the early stages of acute otitis media, tenderness of the mastoid may be present and subside in a day or two. If it then recurs and there is tympanic drainage present, operation is indicated if it persists for 24 to 48 hours, even though there are no other signs present indicating the necessity for opening the mastoid. It should be remembered that it is quite possible to have an extensive mastoid involvement without any sign of tenderness and absence of tenderness must not be considered an absolute sign that operation is not indicated. This is especially true in cases in which the mastoid cortex is thick or the mastoid is of the sclerotic type. A thick cortex is usually present in individuals beyond 40 years of age and delay in recognizing operative indications in such cases is especially dangerous as necrosis and infection within the mastoid bone is likely to extend inwards and cause complications. Tenderness could be demonstrated in 96 per cent of the cases in children and 93.5 per cent of the cases in adults.

External changes over the mastoid bone, when present, usually furnish positive indications for operation. It sometimes happens, however, that in the early stages of an acute otitis media, before the drumhead ruptures or when the drainage through the membrana tympani is insufficient, that external changes may occur, such as redness and edema, due to a periostitis. This is especially likely to occur in children and it often happens that thorough incision of the membrana tympani and the establishment of free drainage will be followed by the rapid subsidence of signs of mastoid involvement.

The presence of swelling and edema must be differentiated from a similar condition due to infection from the external auditory canal. In an external otitis there is swelling in the outer cartilaginous portion of the canal, with areas of tenderness on palpation and pain on movement of the auricle. When pus forms beneath the periosteum resulting in redness, swelling and sometimes fluct-



vation over the mastoid, the indication is to operate and to do a complete simple mastoidectomy. These external mastoid signs are more commonly present in children due to the relatively thin mastoid cortex through which the pus breaks; or, in infants and young children, to the presence of a patent squamomastoid suture which has not yet closed. The presence of a subperiosteal abscess is therefore quite frequent in acute mastoiditis occurring in young children and, while it usually means operation, if there are no urgent operative indications present, there is no great danger in delay for 24 to 48 hours, in order to obtain free drainage by incising the drumhead, as the opening through the vertex acts somewhat as a safety valve and lessens the danger of extension of infection to intracranial structures. For these reasons acute mastoiditis is usually considered less serious in early childhood, than in adult life, more especially when occurring in individuals beyond middle age. During adult life and especially in the aged, the cortex of the mastoid bone is hard and dense, the sutures are firmly united, and external changes over the mastoid are the exception. With other indications for operation present, to wait for external signs will subject the patient to the possibility of dangerous complications and is to be severely condemned. External changes over the mastoid bone were present in 54.3 per cent of the cases occurring in children and in 40.2 per cent of adult cases.

Changes occur at the inner end of the external auditory canal in a considerable proportion of cases, and, when present, are a valuable diagnostic sign of mastoid infection. These changes consist of a swelling or sagging of the superior and posterior wall of the canal in close proximity to the membrana tympani and indicate a periostitis which has extended from the infection in the tympanic cavity or is due to pus which has extended from infected mastoid cells. It is frequently an early sign of acute mastoiditis and is considered an operative indication. Such changes in the canal wall must be differentiated from an external otitis or furunculosis. In external otitis, the infection is in the outer cartilaginous portion of the canal and in mastoiditis the swelling is at the extreme inner end of the bony meatus and close to the membrana tympani. Such changes in the canal wall in close proximity to the drumhead were noted in children in 33.3 per cent and in adults in 42 per cent.

The character and duration of the aural dis-

charge is often an important sign of mastoiditis. The quantity may be so great as to indicate that the source of discharge is not confined to the tympanic cavity but that the antium and possibly the cells are also involved. A copious middle ear discharge does not of itself constitute an indication for operation unless it continues unduly long, (four or five weeks) with free tympanic drainage, in which case there is grave danger that the discharge may become chronic, and the seriousness of a chronic aural discharge can not be too strongly emphasized. A chronic purulent otitis media not only means a chronic mastoiditis with the possibility of complications, but it means the constant presence of a dangerous focus of infection, and it means the certainty of progressive impairment of the function of the middle ear.

There are some general considerations that frequently have an important influence upon our decision as to operative interference in acute mastoiditis. As the course of an acute infection depends quite largely upon the general and local resisting powers of the individual at the time of infection, and upon the virulency of the infecting organisms, it is evident that an acute otitis media or signs of an acute mastoid involvement occurring during the course of an acute or chronic infectious disease, have a graver significance than when the same middle ear or mastoid infection occurs in an otherwise normal individual. Closer observation and more radical measures for combating the infection are also demanded. That the importance of this has not always been recognized is shown by the large number of cases of chronic purulent otitis media which had their onset during or following an attack of scarlet fever, measles or influenza. In many of these cases, there were probably some signs of mastoiditis which subsided leaving a discharging ear or in some cases no other signs of a mastoid involvement than a profuse middle ear discharge which was allowed to continue. If after a reasonable length of time, with proper treatment, the discharge had not ceased, a simple mastoidectomy would probably have prevented the discharge from becoming chronic and would have restored the normal function of the middle ear. Exceptions to this sometimes occur, especially in scarlet fever, where the virulency of the infection is so great that rapid destruction of the membrana tympani takes place with necrosis of bone in the tympanic cavity. Examination of the discharge from the middle ear should be made to determine, if possible the

infecting organisms, as the virulency of the micro-organisms will often influence the course of the mastoid infection. The streptococcus is the most frequent infecting agent, and causes the most extensive bone destruction and the most serious complications. This is especially true of the streptococcus mucosus capsulatus which produces extensive bony necrosis and is frequently unaccompanied by any marked signs or symptoms indicating an extensive involvement of the mastoid. Pneumococcus also frequently causes a serious type of mastoiditis especially when complicating an attack of influenza. The staphylococcus is less virulent and less liable to cause serious complications.

In the series of cases reported, cultures made at the time of operation showed streptococci in 53.4 per cent in children and in 58.8 per cent in adults; pneumococci in 19 per cent of cases in children and in 26.5 per cent in adults, and staphylococci in 28.6 per cent of these cases operated in children and in 14.7 per cent of the adult cases.

Blood examinations are not of much value in uncomplicated mastoiditis. There is generally a moderate leucocytosis. A high polymorphonuclear percentage would indicate the passage of micro-organisms into venous circulation and would be suggestive of a sinus complication.

The x-ray is of value in mastoid diagnosis and will frequently give us valuable information as to the pathological changes which have occurred within the mastoid process. During the early stages of an acute mastoiditis, the radiograph will show a cloudiness over the areas of the mastoid cells. This does not constitute an indication for operation as it may be due to simple congestion of the mucous membrane lining the cells. If the plate shows that the septa between the cells are broken down or shadows indicating the collection of pus in definite areas of the bone, it will indicate the necessity of operation. The radiograph also furnishes valuable information as to the type of mastoid present, location of the lateral and sigmoid sinuses, the presence of zygomatic cells and it may be the means of diagnosing a perisinus or epidural abscess.

Symptoms of toxemia are sometimes present. Malaise, insomnia, restlessness, slight temperature, when occurring with free drainage from the tympanum, frequently mean an extensive mastoid involvement and are an indication for operation.

In the series reviewed, complications were pres-

ent in 13 per cent of the cases in children and in 24 per cent of the cases in adults.

These complications are mentioned to show the frequency of such pathological conditions within the mastoid which are frequently found only at operation. The complications referred to include perisinus and epidural abscess, facial paralysis, labyrinthitis, abscess of the neck, sinus thrombosis and meningitis.

#### DISCUSSION

DR. H. I. LILLIE, Rochester: It occurs to me that this subject has been looked upon with too little attention by general men. In prevention of a surgical mastoiditis the indication is usually a thorough paracentesis in the acute stage of the otitis media.

The general picture of the patient is important. In forty per cent of the patients presenting themselves in the subacute stage, surgery will be definitely indicated. In the group that falls outside of that, the general picture shows the patient not doing well. He has had a discharging ear for several weeks. He has felt incapacitated. He has had night pain. During the day he will feel somewhat better. This is the group in which the complications are liable to occur. The discharge in ordinary acute otitis media lasts from twelve to fourteen days. After a thorough paracentesis, if the discharge lasts longer than this time and continues to increase in amount, or at least does not diminish, we must be suspicious that we are dealing with more than a middle ear infection and that the appendages of the middle ear must be involved. Though operation is not indicated at once, still we must have that patient under observation because he has the type that is liable to fall into the surgical group.

The loss or impairment of hearing is a great disadvantage to the individual. It is an economic loss. Deaf people are likely to be morose and melancholy. At the present time in the east a movement is under way for the care of these people and it is bringing out a great many important psychological factors in the treatment. By doing an operation when it is indicated we can conserve the hearing function and we are doing a great deal for that patient. The operation itself in the uncomplicated cases is unattended by much mortality. In cases of mastoiditis in which operation is unduly delayed there is always more morbidity. The subacute stage, if patient is otherwise in good condition offers the most favorable time for operation as far as healing is concerned. It is not safe to merely open the cortex of the mastoid and allow drainage, because it is in this group where we have found the greatest number of extensions, that is, it is felt that the mastoid cells should be completely exenterated, thus insuring a cure and shortening the time of postoperative convalescence.

A thing I neglected to mention earlier, is the manner of eliciting tenderness over the mastoid process. I think it is very valuable to compare



both sides, that is, by putting the same amount of pressure on both sides we can tell if the patient is tender or not, whereas unless you do it that way a patient who is very sensitive about the ear is liable to make you believe he is tender where he really is not.

DR. J. A. PRATT, Minneapolis: I would like to mention two signs which I think are very important in the diagnosis of mastoiditis. One of them, which you will find in nearly every case, is the temporal pain on the side affected. The other is the pumping discharge that we get many times after the fourteenth day and beginning of the third week. When you have a very little discharge or a great deal of it and you wipe it out, if the discharge is pumping, you know that the antrum at least is affected. We have performed a great many operations which were diagnosed before operating simply on these two signs. The patient would have very little discharge but this pumping of the discharge through the perforation was present. I think these two signs were not mentioned, possibly they were, but we find them very prominent, particularly this temporal pain.

It seems hardly necessary to place too much importance on simple mastoidectomy. Using as we do, the electric burrs, we think no more of doing a simple mastoidectomy than we do of opening the frontal or exenterating the ethmoids intranasally. In our operative work we practically always send our patients home the day following the operation unless they have some other illness. Where we have a patient with a running ear for three weeks, that patient is operated if possible. In my opinion, if you operate early and not place so much importance on the operation because you have no chance of injuring the hearing, you can easily exenterate the entire mastoid and leave no chance of any future trouble.

DR. F. G. WATSON, Rushmore: I would like to lay emphasis on a point that Dr. Lillie made, simply that the best time to operate on acute mastoiditis is not in the very early stage. I have been called so often by the general practitioner in consultation just as soon as they find a little tenderness of the mastoid, sometimes before the drum was opened. The impression seems to have gained ground among practitioners that the moment there are any symptoms of acute mastoiditis you should open the mastoid. I think that is a mistake. Tenderness itself is not an indication that the mastoid should be opened. I think the pumping discharge which Dr. Pratt mentioned while a very strong indication of something wrong, perhaps in the presence of other symptoms, is not an indication that you should open that mastoid. If you will wait a few days after the acute symptoms have commenced, some antibodies will have formed in the tissues, then, if need be, the patient may be operated on.

I cannot agree with the idea of Dr. Pratt in letting patients go home the next day. There is some shock to any patient who has been under an anesthetic, and in the case of an adult I think that any

operation that involves the use of an anesthetic for an hour or three-quarters of an hour the patient should be left in the hospital for a few days.

I have been struck by the fact that none of the speakers mentioned the x-ray in the diagnosis. I suppose that you are like myself disappointed by the aid received from the x-ray. The usual report the roentgenologist gives me is that there is a difference in the two sides, but beyond that he does not say. When a case has reached that stage, when you are able to make a diagnosis without the x-ray, then very often the x-ray will give you some information, but then you do not need it. When in doubt as to whether to operate the x-ray has not helped at all so far.

DR. C. H. MAYO, Rochester: I used to do quite a lot of work on the ear. It has always seemed to me that to open a mastoid is a simple matter.

The distinction I make is whether to perform an early drainage operation or a late extensive operation. In operating in these cases and in discussing them with other physicians, I have decided that in acute inflammation, the ear that does not discharge within thirty hours, with relief of pain should make us suspicious of mastoid trouble; if it is delayed in discharging forty-eight hours, we should be still more suspicious; if perforation for drainage is done and if the pain does not subside after this, then, as Dr. Pratt has said, the trouble must be in the mastoid. If the patient is seen in the late stages there is destruction. The diagnosis should be made early since it is then very easy to obtain drainage. Probably the greater number of specialists do not see the patients until late, and their writings, therefore, relate chiefly to the extensive operation, which appears so formidable that it deters other men from breaking early that little shell to establish drainage.

DR. A. R. COLVIN, St. Paul: I just want to report a case. There is one aspect of the mastoid question which appeals to the general surgeon, that is the question of infected fractures of the base of the brain. I saw several years ago a young man who had a fracture, which, according to the physical signs, extended from one ear to the other with a facial paresis on the left side and bleeding from both ears. He was unconscious for a while but recovered and finally at the end of ten days the left ear began to suppurate and in the course of a very short time he had a very high temperature and became delirious. There was some tenderness behind the ear on the left side. Exploration revealed a suppurating mastoiditis and an extradural abscess; recovery followed the evacuation of the pus.

Some few years later I saw an older man with a fracture of the base and a suppurating ear, also a suppurating mastoiditis, in both of these cases recovery followed the evacuation of the pus. Fractures of the base combined with bleeding ears should be regarded as compound fractures and in the light of these two experiences need not be regarded as hopeless because of infection.

DR. R. G. ALLISON, St. Paul: Dr. Murray did

not give the x-ray side of his diagnosis. I have had occasion to make x-rays on a number of cases that Dr. Murray and his associates operated on. I think Dr. Murray is a firm believer in the x-ray. In some cases in which I made the x-rays, I have advised operating at once and the operative findings confirmed my opinion. In other cases, thought it wiser to delay operation, and the results proved the correctness of the x-ray findings, I do not think I have sent them in on a single case where the mastoid was not involved.

The attitude taken by the men at the Manhattan Eye and Ear Hospital is that the x-ray is necessary to diagnosis. Dr. Fred Law, one of the best authorities on the mastoid, practically refuses to operate without an x-ray diagnosis. At Manhattan it was a revelation to me to see how the ear men relied on the x-ray. They divide their mastoids into first degree, which involves part of the cells; second degree in which there is an involvement of all the cells with a breaking down of the septa, and third degree, in which there is a breaking down of the cells with abscess formation. In acute mastoiditis the diagnosis is perfectly simple from the x-ray standpoint. The things that give you a great deal of difficulty are especially, differentiating the sclerotic mastoid from the infantile type. In the infantile type with its small cells and bad drainage, I am loathe about giving an opinion from an x-ray standpoint. I think you should be guided almost solely by your clinical symptoms, because with the slight drainage that takes place from these small cells, you can have the patient go to the bad very quickly. You can differentiate the involvement of the mastoid cells with the greatest of ease. I have yet to have a single mastoid that we passed up as being normal come to operation and show involvement of the cells.

DR. W. R. MURRAY, Minneapolis (closing): I am sorry that I was unable to finish my paper because I dwelt upon some of the points touched upon by the speakers. Dr. Lillie mentioned some of the symptoms indicating a toxemia. In some cases they may be the only symptoms that indicate mastoiditis and they frequently serve as an indication for operation. Such symptoms of toxemia are manifested by pain, feeling of malaise, low temperature, restlessness and insomnia. Sometimes we have to make our diagnosis entirely upon those symptoms.

In regard to the pulsation through the drum referred to by Dr. Pratt, I have never considered that a very strong sign in favor of operation for mastoid cases. We get that very frequently in the early stage of acute otitis media and it sometimes persists for some time. It is generally produced by pulsation in the circulation within the tympanum. It does indicate that as long as that continues the process is not undergoing resolution, but I do not believe we should consider it as an early indication for mastoidectomy.

In regard to the x-ray, I think that it is of a great deal of value. It is of a great deal of value in obscure cases and is sometimes the determining factor

in operative work. In the early stages of acute otitis media and acute mastoiditis the x-ray will show a cloudiness through the mastoid cells, which does not indicate mastoiditis, at least it does not serve as an indication for operation, but if the x-ray shows a breaking down of the cells then you have a necrosis of the septa and once you get a necrosis of the septa it is doubtful whether the case will clear up without operation. The x-ray also indicates the location of the cells; it indicates whether there are zygomatic cells which may need to be opened; and it very often indicates the location of the lateral sinus.

I am glad to hear that Dr. Mayo favors early operation when operation indications are present.

## SACRO-COCCYGEAL DERMoids\*

JOHN C. STALEY, M. D.  
*St. Paul, Minn.*

Sacro-coceygeal cysts are rare and are usually considered of interest only because of their infrequent occurrence and the obscure manner of their development. Their presence on the posterior sacrum does not produce a disabling condition nor endanger life. However, when once a communication is established between the cyst and the surface of the skin, an intermittent irritating discharge continues until the affected area is excised. Cysts in this location have been mistaken for other conditions, among which are the various infections of the bones, including tuberculosis and pyogenic infections. The external opening of the fistula may be close to the sphincter ani and in that one respect resemble the sinus of perirectal abscess.

In addition to the simple dermoids there are several more complex tumors occurring in this region which are the result of misplaced fetal remnants. The literature concerning those anterior to the sacrum has been well reviewed by Law and by Lund. Those posterior to the sacrum are classified by Ewing as simple dermoids, complex dermoids, teratoid tumors, teratomas and fetal implantations.

The following reported cases probably belong to the class of simple dermoids as suggested by Mallory. By Tillman and others they are called epidermoids because of the absence of glands and hair follicles. The more complex tumors occurring in this region will not be discussed.

During the present year I have examined and operated upon four cases of persistent fistulae oc-

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curing upon the posterior surface of the sacrum or coccyx; the patients were all discharged soldiers and were assigned to the service of which Dr. A. R. Colvin is consultant.

CASE I: A. P. Age 25. Examined February 13, 1920. Family history, negative. Has never been ill with the exception of an occasional cold until the commencement of the present trouble. While on duty in France, in August, 1918, he noticed a small mass which could be felt under the skin at the lower end of his spine. This was lanced by a medical officer. The wound discharged a small amount of secretion until January 1, 1919, when the fistula closed. After closure the mass soon reappeared and was painful and tender. He was again operated upon January 31, 1919. In another Army hospital, he was reoperated on August 1, 1919, and again one week later. The wound continued to discharge and he was again operated upon December 1, 1919. The operations were all done under general anesthesia and he believes an incision was made and a drain inserted on each occasion. At the present time examination shows an indurated mass slightly smaller than a hen's egg over the posterior lower sacrum. A few drops of thin pus may be expressed from a small opening at the lower border of the mass just below the sacro-coccygeal junction.

Operation: An incision was made 3 inches long over the posterior surface of the sacrum to the tip of the coccyx. A probe was passed into the fistula and the mass, with the fistula, was dissected out. The upper portion of the wound was closed with silk worm gut. A small rubber drain was placed in the lower angle.

Patient discharged March 18, 1919. Cured.

CASE II: R. C. F. Age 24. Had measles and mumps when a child. Appendicitis at 14 years of age. Had remained well until October 1917, when he began to feel pain over the sacral region and noticed a small lump about the size of a marble. The pain lasted several days and disappeared. The lump remained about the same size until January 1, 1920, when it broke spontaneously. An intermittent discharge has kept up to the present time.

Examination: There is a small tumor the size of a walnut over the lower sacrum and upper coccyx. A fistula is present exactly in the midline just below the tumor. A probe passes upward and inward for about one inch.

Operation: February 27, 1920. Local anesthesia. An incision about three inches in length was made over the posterior lower sacrum ending at the tip of the coccyx. A probe was passed into the fistula and a small mass of indurated tissue, with the fistula, was dissected away from the sacrum at its lower extremity. In the bottom of the wound there was seen a small opening, in size about one-half the diameter of a lead pencil. A probe passed through this opening, went into the cavity of the lower sacrum. The canal of the sacrum was examined. The cavity was filled with a brownish granular detritus. The wound

was closed with two silk-worm gut sutures with an intervening rubber drain.

Patient discharged March 13, 1920, wound entirely healed.

CASE III: A. E. Age 27. First seen February 6, 1920. Family history, negative. No illnesses since the diseases of childhood until the present trouble. In September, 1918, while riding on a truck, over a rough road, he was thrown upward and landed in a sitting posture on the posterior part of the seat, striking the end of the spine. The next day there was a swelling over the sacrum which has never disappeared. In March, 1919, he noticed a small amount of discharge from the lump. Since that time the discharge has kept up intermittently.

Examination: A fistula is present opening in the midline over the coccyx. It leads slightly upward, to the sacrum. The small mass is felt over the lower sacrum.

Operation: February 25, 1920. General anesthesia. An incision was made from the center of the coccyx unward 3-inches in the midline. A probe was passed into the fistula. After dissecting away the indurated mass a probe could be passed into the central canal of the sacrum at its lower extremity. The incision was continued in the midline exposing the canal with open lower lamina. The canal was found to be filled with a brownish detritus. The bone and periosteum show no sign of inflammation. Wound closed with silk worm gut. Rubber drain inserted between the sutures.

Discharged March 20, 1920, wound completely closed.

CASE IV: L. D. T. Age 35. Family history negative. Had pneumonia when a child. Received a minor wound in France in August, 1918. No other illness. First noticed a lump the size of a marble at the lower end of the spine January 1, 1920. A week later it became painful. Without consulting a physician he applied poultices which he says had the effect of producing a discharge which has continued intermittently since that time.

Examination: The opening of a fistula is seen in the midline over the lower coccyx. A probe passes upward 1.5 inches. A slight indurated area can be felt at the point where the probe is obstructed.

Operation: January 31, 1920. Dissection of indurated tissue and fistula made through a midline incision 3 inches long ending at the tip of the coccyx. Fistula does not lead into the sacral canal. Wound closed with silk worm gut. A small rubber drain inserted between sutures.

Discharged March 2, 1920, wound completely healed.

Literature with reference to this particular cyst is rather scanty. It appears that Mallory's work done in 1892 is the most comprehensive. He cross-sectioned the sacral region of a fetus of six months. There was found between the skin and sacrum a cavity lined with columnar and stratified epithelial cells. Microtome sections of the same

region were made in 7 cases, the youngest fetus being 3.5 months, the oldest, 6 months. Small open spaces of the same character were found in this region in all but one. The cyst contained no glands or hair follicles and because of that fact Mallory thought that the cysts probably could not have been derived from the skin. He considered the possibility of their being vestages of the medullary tube. This tube during the second month is found to lie in the center of the spinal cord. At this time the spine is growing more rapidly in length than the cord. So that there is an apparent retraction of the cord. The portion of the cord over the sacrum becomes fibrous and is the filum terminale of the adult. In this fibrous termination there are small open spaces lined with columnar epithelium. Mallory considers the possibility of cell remnants of this region being the antecedents of the cysts which he noted in the sacral region in 6 of the 7 fetuses examined. As pointed out by Mallory the cells lining the cysts he described, exactly resemble the pavement epithelium of the skin excepting only for the absence of glands and hair follicles. This seems to indicate a derivation of the cysts from the ectoderm.

According to Tillman the cysts are due to the development of displaced ectodermal cells of an earlier period, that is, from the second to the fourth week. Beginning in the human embryo about the 14th day, the medullary plate begins to sink below the surface of the ectoderm. The medullary tube is formed by the folding in of the sides and is closed from before backwards. After closure the tube lies below the fused edges of the ectoderm. During the fusion of these edges it is believed an opportunity is offered for the isolation of these groups of cells. The neurenteric canal leads from the posterior end of the medullary plate to the enteric canal. It is normally closed before the complete closure of the medullary tube. It is thought that cell remnants from this canal are the antecedents of cysts anterior to the sacrum and it has been suggested that its failure to completely close at its outer extremity may be the source of fistulae posterior to the sacrum and coccyx. It is an interesting fact that in the new-born there is to be seen many times a small depression or dimple in the soft parts over the coccyx in the mid-line. This is called the fovea coccygea (Mallory, Roux). In the fetus, the depression, when seen, is deeper and may lead into a blind canal. There is a specimen in the collection of the University

of Minnesota in which the canal is just wide enough to admit a fine probe and about 1 centimeter in length. There is nothing in the history of the cases that have come under my observation to show that the cysts were in any way related to these blind canals. Because of its location the patient obviously could not say whether or not a blind canal was present from infancy.

#### PATHOLOGY

The largest specimen removed was the size of a hen's egg,—the smallest the size of a marble. The tissue was hard, grayish white in appearance and of approximately the consistency of cartilage. The masses were not encapsulated, the indurated tissue merging with the surrounding soft parts. Microscopically there is seen the pictures of chronic



1. Low power of specimen removed from sacral region of adult male. Cut perpendicularly to the lumen of the sinus.

inflammation with fibrous connective tissue irregularly arranged and infiltrated with leucocytes, many of which are eosinophiles. There is an occasional group of foreign body giant cells. All evidence of a cyst wall has been destroyed by the inflammatory process. The fistula tracts averaged about 1.5 inches in length. In two cases the tract communicated with the cavity of the lower sacrum. From each of two cases a few dark hairs, about 1 inch in length were removed. Microscopically the canal is seen to be lined by many layers of epithelial cells, stratified squamous on the surface merging to columnar at the periphery. Immediately beneath the epithelium is seen fibrous connective tissue with the fibres arranged for the most part concentrically. At a distance this arrangement is



broken up. Everywhere there is an infiltration of the connective tissue with leucocytes, many of the eosinophile type. There is an occasional group of giant cells characterized by an unusual number of nuclei.

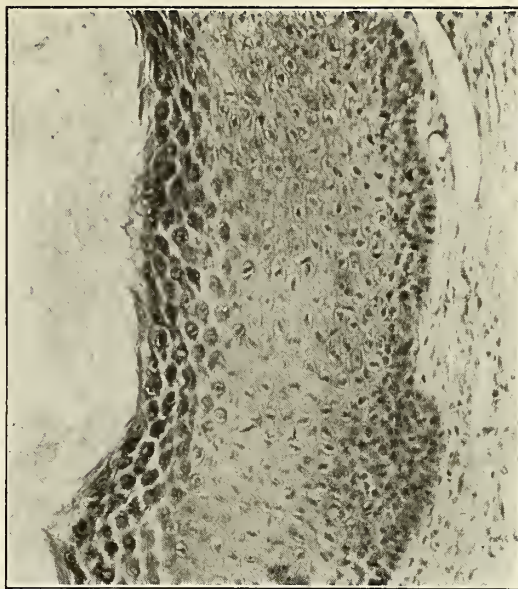
#### DIAGNOSIS

The condition is seen most frequently in young adults and in otherwise healthy individuals. In the nineteen cases collected by Mallory the average age was twenty-one years.

The fistulous opening when single is usually in the midline. It may be below the tip of the coccyx and close to the external sphincter. When found in that location the fistula may easily be mistaken for the sinus resulting from perirectal inflammation. The openings may be multiple, one above the other, or the tracts may extend outward from the midline under the subcutaneous tissue of the back or buttocks. Of the above mentioned cases collected by Mallory, 4 of the 19 had two or more fistulae. In some cases there may be a large area of inflammatory tissue with many sinuses and closely resembling tuberculosis of the sacrum. It may not be possible to determine the character of lesion in such cases before operation when a normal sacrum is found to underlie the mass of inflammatory tissue.

#### TREATMENT

When one considers the pathology of the condition, which is that of a tube lined by epithelium extending from the surface of the skin into a mass of chronic inflammatory tissue, it is evident that anything in the way of treatment except complete excision will not be effective. After passing a probe into the fistula it should be dissected out down to its termination. Then, by means of



3. High power transverse section of epithelial lined sinus showing resemblance to skin epithelium and absence of glands.

the finger tip the indurated areas are identified and completely excised. The wounds in the four cases above reported were partially closed with silk worm gut sutures; a drain was inserted between the sutures. Three cases were given ether, one was done with local anesthesia and was followed by more local reaction than was noticed in the other three.

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#### DISCUSSION

DR. A. A. LAW, Minneapolis: Sacro-coccygeal tumors naturally fall into three definite groups, the simple dermoid cysts, the teratomata, and the mixed tumors so-called. Other tumors, rather general in their distribution, are quite rare in this region.

Dr. Staley's slides show beautifully why the simple dermoids are derived from the ectodermal layer, as they show a pinching off and infolding of the ectoderm in the coalescence of the cutaneous lines. Later in life this pinched off ectodermal anlage may receive some stimulus and start to grow. This explains the development of the simple dermoids, but it does not explain the more complex tumors, like the teratomata and the mixed tumors.

The essayist spoke of the neurenteric canal. Early



2. Lower power of specimen removed from sacral region of 3.5 month fetus by Mallory.

in fetal life, this canal communicates with the primitive gut. When the proctoderm invaginates to form a part of the cloacal chamber, it meets the hind gut at a point in front of and some distance above the place where the neurenteric canal has its opening into it; therefore, there remains for a period a part of the gut down behind the anus, called the postanal gut; this later becomes obliterated as does also the neurenteric canal. After maturity is reached, or sometime before, under some unknown stimulus, vestiges remaining from these obsolete canals are responsible for the so-called teratomata, and if the vestiges contain remnants of the ectoderm and mesoderm they explain the so-called mixed tumors.

Dr. Staley's cases reported demonstrate the necessity of radical operative intervention. It is not enough to simply curette the sinus; we must remove in toto the foetal rest which is responsible for the sinus and dermoid.

There has been an interesting theory advanced to explain the formation of these tumors. I am quoting Thompson who sponsors Adami's observations of the so-called growing points of plants, where a rapid growth is brought about by the division of the daughter cells at the superior and inferior growing points in the root and stalk; in the mammal they start at the base of the brain and in the sacral region. At the time of development of the nervous system the complete development of the growing points stops for some reason. Through some exciting agent, if the growth continues after the mammal has reached maturity, the cells have the peculiar property of reproducing the three primary germinal layers. Therefore, Adami affirms, this explains the etiology of the teratomata and the mixed tumors which occur in the region of the sacrum and at the base of the skull.

DR. E. Z. WANOUS, Minneapolis: I would like to speak of this problem from a practical standpoint. In my experience I have seen two cases that were operated for ischio-rectal abscess. I think that is probably the most common mistake made in diagnosis. The first case I saw was a man who had been operated on two or three times. The wound would heal, then he would have another abscess, and the condition would give him trouble. In speaking to me about his condition he made his own diagnosis. He stated that on one or two occasions, when the abscess was opened by the doctor, he noticed some hair come out of it. The doctor had made a diagnosis of ischio-rectal abscess and had curetted it without giving the patient relief. We followed the fistula to its source, removed the cause, and the patient had a permanent recovery. Another man had had the abscess opened half a dozen times. He has several fistulae around the rectum, and it looked like the remnants of an ischio-rectal abscess. Fortunately we were able to make a correct diagnosis and to give him relief.

DR. E. M. JONES, St. Paul: The fact that it has been shown that we have 20 per cent recurrences in sacrococcygeal dermoids should lead us to a careful consideration of any condition that arises there. It shows there is something lacking. Some of the

pathological conditions arising here are the simple acute suppurative conditions; local or deep fistulas extending up from tuberculosis affecting the soft parts or the bone; chronic infection due to burrowing upwards of fistulous tracts, ulceration, and new growths. We also have congenital tumors that are under discussion now.

The treatment of these conditions is well understood, and the treatment of the congenital tumor is the most difficult. The fact that there are recurrences in many cases after apparently thorough dissection, is because the tumors are often multiple and one or more nests are overlooked. It is important in having infection or any trouble in this locality to determine the nature of the infection, and then treat it thoroughly, particularly these congenital tumors, and when you dissect out the fistulous tracts thoroughly, as pointed out by Dr. Law and Dr. Staley, your results are more likely to be good.

Another point is to be sure you do not overlook any underlying disease.

In a series of 630 cases collected at a New York Hospital, it was found that of rectal cases they had 8 of congenital tumors of the sacrococcygeal region. This shows that it is a comparatively uncommon condition, and I believe, when these cases become infected and come into our hands, in taking the scalpel and opening the tumor or cyst we only afford temporary relief. We do not remove the cause. It is necessary to put these patients under good anesthesia and do a radical operation.

## A PLEA FOR BETTER REFRACTION WORK AND FOR MUSCLE TRAINING\*

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As one who has lately returned to practice from seven long years of lonely research work, and rather for the sake of further fraternal companionship than of any strenuous and competitive activity, I may perhaps be pardoned if I offer, under the heading of a plea for more careful refraction and for muscle training, not so much instruction as a kind of brotherly adjuration for the better doing of things already known but not so strictly attended to as they ought to be. I hope that no one present will get the idea, from what I am going to say, that I intend any sort or kind of criticism of the work being done at the Head of the Lakes. About that work I know, and can possibly know, almost absolutely nothing. I am going to speak solely of conditions in general, as far as I happen to be familiar with them, which obtain in various

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portions of the United States. I have refitted glasses (just as everybody else has done) which had first been fitted, or misfitted, in Chicago, Kansas City, Peoria, Ill., and St. Louis, Arkansas. The finest piece of work I have ever found was done by an optometrist (who had labored three days on the task) in a tiny country town in Southern Illinois, and the worst (a job that almost called for hanging) was performed in a very large city by an eminent and exceedingly able professor of ophthalmology. The professor had been in a hurry, as professors are apt to be. He sadly overcorrected a case of progressive myopia, and got his really symmetrical axes unsymmetrical, besides. As an end result there developed a double detachment of the retina and absolute blindness. Need I offer an apology, Ladies and Gentlemen, for speaking before you on a subject which involves the cure (or the failure to cure) not only of a host of so-called "minor" symptoms—headache, neuralgia, nausea, disturbances of nutrition—with consequent inability on the part of the patient to secure an education or to perform his daily tasks, but which even involves the preservation of the organ of sight itself? More and more, as civilization goes on, people are coming to "live" in their eyes. Now few eyes are optically perfect, and on the refractionist and muscle trainer—whether optometrist or physician—depends the ability of the subject to keep his place in "the great march."

First, I would speak of errors in the fitting of glasses; lastly, of the most neglected field in all the wide curative domain—namely, ocular muscle-training.

As to errors in the fitting of glasses, first of all is that esthetic as well as scientific mistake, the fitting of lenses of enormous diameter and in the so-called "shell" frames. This hideous fad began in 1914, rapidly spreading throughout the nation until, in the course of a couple of years, almost every man, woman and child, had lost all individuality of appearance, presenting, in fact, a countenance wherein the predominant factor was not (as ought to be the case) the eyes, but the spectacles. The American people have, in sober truth (although it seems impossible) presented, in greater part, for a period of about six years, the appearance of massive pairs of spectacles, going up or down street, with, incidentally, human beings behind them. But the esthetic sin is not, by any means, the worst committed by the ordering of such glasses. It is a well known fact that, as a rule, the distance be-

tween the centers, of the lenses in a pair of spectacles or eyeglasses, should be exactly the same as that between the centers of the pupils of the eyes. As to glasses worn in reading, the interpupillary distance of the glasses ought, in fact, to be a trifle smaller than the interpupillary distance of the eyes. Now it is practically impossible to prescribe for narrow faces, or wide faces if the eyes sit close together, a pair of 40-44mm. lenses in shell frames without the interpupillary distance of the glasses being greater than the interpupillary distance of the eyes. The lenses can, it is true, be decentered in the frames, but much decentering is difficult and costly, in lenses of large diameter, and, in sober fact, the decentering is usually not done. As a consequence millions of people in this country are daily suffering from eyestrain, just for the sake of a fad.

It is said, to be sure, that a 40 mm. lens, round, does not necessitate any wider interpupillary distance than a 40-mm. lens, oval, such as often is used in metal framed, or rimless, spectacles. Very true, but, in the case of narrow faces, the 40 mm. oval should not be prescribed in one kind of frame or another, but, in any case, a lens that is small enough to make the interpupillary distance precisely right. This cannot be done in the shell frames, which, as I am informed by one of the manufacturing opticians in Duluth, do not come in any less diameter than 36 mm. There is another point. You have to add double the thickness of the shell to get the true diameter of the lens, for half the lens-diameter and one frame-thickness stand between lens-center and the patient's nose. Then again, in metal frames, or rimless mountings, the lenses can, if far enough forward, be brought in front of the nose some 2 or 3 mm. at the greatest diameter of the lens, while, when the nose-piece of a shell frame is also of shell, this cannot be accomplished.

There is yet another foul crime to be attributed to lenses of enormous size. It is well known that the customary lens is ground correctly only for a very narrow area in the center of the glass, in fact, just 25 degrees in each direction from its center. As the eye looks through the more peripheral part of the lens, it gets both longitudinal aberration and also astigmatism from oblique incidence. Such fearful disadvantages are, it is true, avoided by the use of a lens of wide aperture, for example, a "Punktal" lens. But such lenses involve additional expense, and, in fact, are not very often

prescribed. Nor is even this the whole of the indictment. The so-called "shell" frames are not shell, but celluloid, and are, in consequence, explosive. You are all familiar, as physicians, with burns and other injuries produced by the explosion of celluloid combs, hair-brushes and collars. Now the explosion of the celluloid eyeglass or spectacle frame is likely to be a much more serious affair, if only for the reason that the explosive material, when the spectacles are in position, is very much nearer to the eyes. One of my neighbors, only about a year ago, while waving out a match with which he had just lighted a cigar, exploded the right-hand frame of his "shell" glasses. They were "shells," sure enough. He was not so badly injured, however, as the most of those who suffer from such explosions. A small amount of celluloid, or "shell," upon the temples, just where these go back of the ears, is comparatively safe, and, being very pleasant and soothing to the ears, is permissible. But, elsewhere, the so-called "shell" (which, let me repeat, is nothing more or less than celluloid) is about the worst possible material that can be employed in the manufacture of spectacle frames unless it be dynamite or t. n. t. Perhaps these substances also will soon be in fashion. Celluloid itself is, in fact, made chiefly from camphor and gun cotton. "Fashion hunts for the worst," is an old proverb.

I do not want to be too reprehensive. Doctors are human beings, and, ordinarily, do simply the best that they can. Some patients will not wear glasses at all unless prescribed these hideous and unscientific affairs. Well then, of course, we prescribe them. I prescribe them almost daily. I cannot help myself. No ophthalmologist can, in fact, do otherwise than prescribe them. All I insist upon is that the doctor tell his patient plainly the various disadvantages to which the use of shell frames and 38 to 44 mm. lenses will almost certainly subject him. Then, if the patient shoulders the consequences himself, the doctor is clear of the burden. One cannot take a club and beat sense into a patient. One ought, however, to take time, and reason with him. If no result, the doctor has done his duty. Better the shell frames and correcting lenses, in cases of eyestrain than nothing at all before the eyes.

I am happy to add that "shell" frames and enormous lenses are rapidly going out of date. Recently I spoke to the managers of three of the largest optical houses in Minneapolis. All three

informed me that, whereas, a short time since, they were selling 40-44 mm. lenses and "shell" frames almost exclusively, they now are selling three or four pairs of lenses of moderate size in rimless gold mountings to one pair of the former and very hideous kind. In Philadelphia and New York, these gentlemen informed me, the fad is deader than in Minneapolis and St. Paul. Just when the hoped for funeral will occur at the Head of the Lakes I am unable to predict. But let us all, as scientists, and not mere mongers of fashion, do all we possibly can to speed the blessed day.

Another very common mistake in the fitting of spectacles comes from the use of the lens-measure. I have no time to expound in detail the various fallacies of this instrument. Suffice it to repeat the words of the highest authority on ophthalmic prisms and lenses, Charles F. Prentice, M. E., of New York City. Says Prentice: "The so-called lens-incasure is indeed practicable only for *concave* lenses, since they alone are of negligible thickness, but, for thick convex lenses, above 7 dioptries, this instrument is absolutely unreliable; nor can it be used on any other lenses than those having a refractive index of 1.5." When you consider that the two chief manufacturing opticians in Duluth employ, the one the Bausch and Lomb, the other the American Optical Co., glass, and that these two glasses have different indices of refraction, you can see in a moment what is involved when the refractologist employs the spherometer, or lens-measure.

Moreover, in neutralization, it should be recalled that concave and convex lenses, being necessarily of different thicknesses, do not accurately neutralize in accordance with their respective curvatures. An equibiconvex lens and an equibiconcave lens, each of a 10 dioptry curvature, on each of its two surfaces, cannot possibly neutralize each other. Just consider. Two such lenses, set in apposition, face to face, optic centers exactly in line with each other, constitute not a piece of plane glass but the central portion of a very large, deeply periscopic lens, with a net plus effect. In other words, a plus lens which is exactly neutralized by a minus 20, is not a plus 20 lens. It is a plus 19, with a decimal left over that is absolutely negligible. In a word, we may say that a plus 19 and a minus 20 lens neutralize each other exactly.

Yet another mistake arises from confounding degrees with prismdioptries. At first, prisms were



designated by the degrees of their principal angles, regardless of the index of refraction, and, therefore, of the deflection of the image which the prism produced in the field. Later, this was felt to be unscientific, and prisms were then designated according to the deflection produced in the field. This kind of "degree" is about half the value of the other kind. Then the "centrad" was introduced by Dr. W. S. Dennett. Now, the centrad is the hundredth part of a radian, and a radian is an angle whose arc is the same length as its radius i. e., 57 degrees and a little over. The value of a centrad is therefore a little over half that of a degree of deflection. Now, all these kinds of units of measurement are values. A prism-dioptry, however, is a tangent value. To make a long story short, a prism-dioptry is approximately half the value of a prism-degree. Look in some trial cases and you will see the prisms marked with figures and a tiny circle after each. That means so many prism-degrees. Look at other trial-cases, and you will see the prisms marked with figures and a tiny triangle after each. That means so many prism dioptries. If the prisms in your trial case are marked with the little triangles, and you, in writing your prescription, call for degrees, you will be making the strength of your prism approximately double what you intend it to be.

Another very common mistake in refraction work, especially in the fitting of patients who have been operated on for cataract, is to set (as is usually done while fitting) the sphere in the backmost cell of the trial-frame and the cylinder in the foremost. Often (especially for the poor) a catrex lens, or a catral, is not prescribed, on account of the expense. Even an ordinary periscopic lens may be too costly. Then, of course, the optician, when he grinds the lens, very properly puts the sphere on the anterior surface and the cylinder (if it is the weaker element, and it nearly always is) on the backmost, thereby securing less aberration than if he did the other way. The patient therefore receives his glasses with the relations of the elements of his lenses simply reversed from what they were when he was being fitted or misfitted. The cylinder has been weakened and the sphere strengthened. Before we write a prescription for such lenses, we should try the cylinder in the backmost cell, and the sphere in the foremost, and remember that that is the relation which these

two elements of the lens will maintain to each other when ground upon one single piece of glass.

There is one more exceedingly important, if also very simple matter. Often a patient returns with his convex reading glasses which we have recently prescribed, saying that they "draw" his eyes. We know that we got the strength of the lenses right. We were very careful about that. Yet the patient cannot wear his glasses. What's the trouble? The trouble almost always lies in the fact that the patient's internal recti muscles are too weak, or what amounts to the same thing, the external recti are too strong. A doctor, when fitting glasses, should always test the various muscles. Then, if the internal recti are too weak, he should give the indicated strength of lenses, but have the patient return again and again to have his internal recti strengthened by appropriate, graduated exercises. What, as a rule, does a doctor actually do? He lessens the interpupillary distance, which coddles the internal recti and so begets a further weakness in them, or else he cuts the strength of the convex lenses so that a fraction of the patient's presbyopia is left uncorrected. By either of these methods he induces the patient to wear his glasses without complaint. Such short cuts, however, to good terms with a patient, are generally reprehensible. Nevertheless, they are, sometimes, the absolutely only methods that are open to the doctor. And why? Because the general public has never been educated to the tremendous necessity for the training of the ocular muscles. I have even heard ophthalmologists declare that, the refraction once corrected properly, the equilibrium of the muscles will take care of itself. That, however, is, in general, a gross misstatement. It is true only of pseudo-heterophoria. Men who make the statement are not accustomed to testing their patients' muscles after the glasses have, for a time, been worn. If the patient has received decided benefit, he is very well pleased. Why, then, thinks the doctor, should not he also be satisfied? We, as physicians, should never be content except when the absolute maximum of benefit has been conferred upon our patients.

Of course I am not attempting to mention all, or even all the commoner, mistakes which are made, sometimes necessarily, sometimes unnecessarily in the fitting of glasses. I have given only a few samples.

Now I come to the second and final portion of this paper, namely, muscle training.

I have already stated that the ophthalmologist, or optician, should, when testing eyes, test not only the refraction, but also the tonicity, duction, version, and endurance of all the various muscles which move the eyeballs in, out, up, down, and also which rotate the eyeballs on their antero-posterior axes. Then, when heterophorias exist, that is to say, lack of balance in the strengths of opposing muscles, or even an actual balance which, however, is due to weakness only, then this pitiable condition ought to be corrected. For those who are not ophthalmologists, I would say that the question here is complicated. Whether the triceps muscle of the arm is stronger than the biceps, or the biceps stronger than the triceps, is a matter of little moment if only the muscles are strong. But the tiny muscular ribbons which move the balls of the eyes must not only be strong, they must be also correctly balanced. And not only must the opposing muscles of each single eye be balanced, in order to point and hold that eye correctly and without fatigue, but various pairs of muscles in both the eyes must be correctly balanced, each against each. The problem is further complicated by the fact that some of the extrinsic ocular muscles perform not one, but two and even more, functions. No such delicate problem presents itself in any other part of the body. Let the intricate muscular apparatus of the eye become even a little disturbed in its equilibrium, and there is suffering, or, at the very least, ocular inefficiency.

Now, under these circumstances, a person would think that the ophthalmologist would, when fitting glasses, invariably endeavor to get at the true condition of the ocular muscles. Yet, as a rule, he does not. The time and energy consumed in doing such work, and doing it as it ought to be done, is simply enormous. I remember that, when in practice before, I would wellnigh hate myself, because, with operations waiting, I had not the time to dig down deeply into the muscular troubles of my patients. Sometimes, when busy with ocular surgery, I would even almost hate the refraction patients themselves, because they took so very much time from matters in which, just then, I was feeling a greater interest. Again, I would become more deeply absorbed in refraction and muscle work than in surgery, and then I would almost hate my operative patients because their demands on my time and attention came in as a kind of impertinence upon this highly engrossing occupation. I have talked with other ophthalmologists,

and many of these, I found, have had similar psychological experiences. Optometrists do, as a rule, confine themselves to the fitting of glasses, but they know nothing of the many diseases of the eye, or of ocular dependence on general diseases, consequently they often fit glasses, or attempt to fit them, when the patient is sadly in need of attention to his kidneys, his pancreas, his hardened arteries, his heart-disease, his bad teeth or tonsils, or perhaps his syphilis. One of the very saddest cases I have ever known, in the course of a long experience, was that of a syphilitic whose family was wholly dependent on him, and who, though suffering from syphilitic neuro-retinitis, was fitted by a jeweller, time and time again, until he became totally and hopelessly blind. Moreover, all the golden hours during which the ravages of his syphilis in other portions of his body might have been arrested, were ignorantly permitted to go by. Later, he died in the hospital for the insane at Anna, Illinois. The wife and mother went to working out, and the sadly neglected children to the dogs. An exceptional case? I would not say so. On the other hand, I have seen, as already mentioned, some cases in which the optometrist's refraction work had very much excelled the work of an M. D. ophthalmologist. The broad training of the physician and close specialization are *both* required.

Muscle testing cannot be done in a hurry. Many times I have seen (once again, I speak not of the Head of the Lakes) an ophthalmologist sit his patient behind a binocular phorometer, and, after a little turning of the lever, and a very few questions decide: "There is nothing the matter with the muscles."

Now, not only is a binocular phorometer a bad instrument, but why did the doctor think he had really tested the eye-muscles, when all he had done was to test those muscles for tonicity? Orthophoria may be sthenic or asthenic. Muscles, in other words, may be balanced in weakness, as well as in strength. No set of eye-muscles has been accurately investigated until not only the tests for tonicity, but also those for duction, for version, and even for endurance (by means of the ergograph) have been most carefully applied.

The greatest trouble is that the medical profession itself, as well as the laity, does not fully appreciate the almost incalculable importance of what is sometimes contemptuously spoken of as "spec fitting." The fitting of spectacles is a field



of almost infinite extent and difficulty. We must educate, first ourselves and afterwards the laity, to demand a higher standard for such work, and, in the case of the laity, to pay for the time and trouble which such a standard necessarily demands.

Such a proceeding as I have briefly outlined, would exact that the refractionist who followed it should fit not more than three, or, possibly, four, pairs of eyes in a single afternoon. Sometimes, in a specially difficult case, he could not fit any more than a single pair of eyes in two, or even three, afternoons. But the work, in case the refractionist understood his business, would then be done with all the thoroughness with which a lawyer would delve into the case of a client whose life he intended to save. It would be done right. It would have to be charged for in accordance with the time and trouble consumed (no use to pretend to the contrary) but it would be done right. Dead-beats and hurry-fools would necessarily exclude themselves from its benefits. Moreover, for the present, we shall have to do merely the best that we can. I have spoken in this paper of ideal conditions. But may we not hope that the time will soon arrive when the more intelligent portion of the public, as well as the medical profession, will not only permit, but even insist, that such highly important work shall be performed in a wholly befitting manner?

## THE TREATMENT OF TRACHOMA\*

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The incidence of trachoma in the west north central states which include Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas, has not been considered of sufficient importance to arouse general attention. Except in localities where circumstances of employment are accountable for racial or nationalistic aggregations the disease is rarely found in endemic form and even then a rather small percentage of all persons are found to be affected.

On the iron range of Minnesota, among the Indians of the Dakotas, and among the inhabitants of the mountainous regions of Missouri the frequency of the disease may be accounted for by poor working and housing condition and the dif-

ficulty of securing proper medical assistance. However in the state of Minnesota blindness is found almost as frequently in the native born as in the foreign born. While definite statistics of trachoma in Minnesota are not available it is significant that while trachoma is given in the census report as the cause of blindness in 1.5 per cent of cases in the United States as a whole it is given as the cause of blindness in 2.9 per cent of the cases in the north central states, which is higher than that for any other group of states, although the actual number of reported cases of blindness from trachoma in this group was less than in some others.\* Thirteen per cent of the cases of blindness in the north central states were reported from Minnesota. As blindness occurs in only a small percentage of cases, the total number of cases of trachoma would seem to be rather large; our experience in the Mayo Clinic indicates, however, that trachoma is a relatively infrequent disease. In 1919 forty-nine active cases of trachoma were found in more than 20,000 persons examined.

The problem in the management of trachoma which concerns us most directly is not the prevention of ultimate blindness, for comparatively few persons in this territory who have trachoma become blind. Because of careful inspection of school children and the segregation and treatment of pupils with trachoma the disease has not assumed the proportions of a menace in our schools. The number of persons who have such a mild chronic trachoma that they defer treatment or are content with inadequate treatment, is sufficient, however, to warrant wide investigation from the standpoint of public health because of the final impairment of vision and the economic loss of the afflicted. The cases of trachoma with which we have to deal are mostly mild and only after years of moderate discomfort cause a loss of visual acuity and deprive the sufferer of the comfort and satisfaction of sight in the declining years of life.

The controversy which arose over the differentiation of trachoma and folliculosis in the early part of the last century is as yet unsettled. The workers in the hot beds of trachoma whose observation and experience cover thousands of cases

\*Three thousand five hundred fifty cases of blindness from all causes were reported from the west north central states in 1910 of which the causes of blindness were reported; 102 (2.8 per cent) were definitely ascribed to trachoma. Seven thousand thirty-seven cases of blindness from all causes were reported from the east north central states, which include Ohio, Indiana, Illinois, Michigan and Wisconsin, in 3,990 of which the causes of blindness were reported; 134 (1.9 per cent) were definitely ascribed to trachoma.

\*Presented before the Southern Minnesota Medical Association, November, 1920, Mankato, Minnesota.

treated for years admit the difficulty in many cases of making definite diagnosis. A digest of the literature on trachoma leads to the opinion that undoubted trachoma exists in localities in severe or malignant form and questionable trachoma or folliculosis exists in other communities where the malignant form is rare or unseen.

The two diseases, trachoma and folliculosis, have a common pathologic basis. They involve the adenoid tissue of the conjunctiva, appearing in the upper or the lower fornix or on the tarsal conjunctiva, and are characterized by various changes in the appearance of the conjunctiva, including the formation of small papillary protuberances, granular follicles, and hypertrophy of the conjunctiva. In many respects the appearances of the conjunctivae are identical in the two conditions and cannot be differentiated at the first examination. The attempt to make an immediate diagnosis on the appearance of the everted lids is probably largely the cause of the late revival of the controversy with regard to the handling of trachoma. It seems to be well established that trachoma is a chronic contagious disease that eventually causes destruction of the palpebral conjunctiva, which is replaced by cicatricial tissue; that folliculosis is a chronic inflammatory disease that eventually disappears with or without treatment, but does not of itself cause destruction of the conjunctiva nor its replacement by cicatricial tissue. Trachoma is peculiarly a disease of the conjunctiva, while folliculosis is only a part of the generalized adenopathy. There is no basis for the assumption that the two conditions could not appear simultaneously. Neither disease is confined to age periods, and trachoma may be acquired following a long period of folliculosis, although the widespread destruction of the adenoid tissue of the eye by trachoma would make it improbable that folliculosis should ever appear after the formation of a cicatricial covering of the tarsus.

Chronic conjunctivitis of an indeterminate character may be trachoma or it may be folliculosis, and it may be both. The symptoms of the two diseases are often the same, the appearances of the lids and conjunctivae are sometimes identical, yet the course of the diseases varies and the end results are not the same. Folliculosis can be cured, that is, it may be made to disappear without leaving a trace of its former existence, but trachoma cannot be cured in the same sense, for it always leaves scars in the conjunctiva. By care-

ful treatment, however, its course can be ameliorated, the symptoms made tolerable, and the ultimate changes less deforming and less disastrous. The damage to vision, which is the disastrous sequel to trachoma, is caused by disturbances in the cornea secondary to changes in the tissues of the upper lid. These changes consist of granular or follicular protuberances, irregular folds and thickenings, hypertrophy of the tissue, cicatricial tissue without glandular function necessary to the proper lubrication of the cornea, contraction of the tarsus with its consequent entropion, distichiasis, and probably lesser incidental changes.

The pannus which accompanies acute and severe trachoma is perhaps the greatest factor in producing blindness through corneal complications as it is the most difficult to control. The presence of pannus is pathognomic of trachoma for it is well agreed that folliculosis does not produce pannus. The next factor of importance in the production of blindness is the cicatricial contraction of the conjunctiva, tarsus, and other tissues of the lid which occurs in the third stage of the disease. With these changes apparent there is no question of diagnosis and little disagreement with regard to the proper treatment. The early stage of trachoma most resembles folliculosis. The disease is then limited to the palpebral conjunctiva, the symptoms often are not intolerable and may last for years without causing the person to seek medical assistance. A rather large number of school children are found to have papillary changes on the conjunctiva that resemble those characteristic of trachoma, but may be only folliculosis. Without further examination for adenopathy such as pharyngeal adenoids and enlarged tonsils, and without observation of lids under a course of treatment by astringents one is hardly justified in pronouncing such cases trachoma. Where such cases occur in number in regions where trachoma is known to exist they may be classed as suspicious and isolated until further observation reveals the true nature of the disease, but in communities where trachoma is rare the probabilities of finding a large number of school children with true trachoma are far too slight to justify the radical measures that have been instituted in some instances, or which would be justified in cases of true trachoma. Persons whose diagnosis of trachoma is doubtful should not be operated on if observation of the effects of various methods of local medical treatment is possible.

The local treatment of these doubtful cases of



trachoma should be carefully carried out and its effect observed by a physician who can vary the treatment as indications direct. Folliculosis of course needs no local treatment. At least the disease is self limited and no harm will come to the eye if it is not treated.

Trachoma in the first stage should be treated by daily applications of 2 per cent silver nitrate solution to the affected area, supplemented by simple non-irritating collyria such as boric acid, normal salt solution, or 10 per cent to 20 per cent solution of argyrol. If this treatment is begun early in the course of the disease the second stage with its attendant discomforts can be shortened or aborted. Operation on the conjunctiva during the first stage is not indicated. A radical removal of tissue is followed by deeper cicatrization than follows the use of silver nitrate solution, and, while the course of the disease may be shortened, the likelihood of damage to the cornea in the later stages is increased. If local medical treatment cannot for any reason be carried out operation followed by proper after-treatment is desirable. However, the proper after-treatment is identical with the treatment without operation so occasions for surgical interferences are rare.

"Inasmuch as inflammation is reflexly excited or at least markedly augmented by sensory stimuli, it follows that inflammation will be more or less inhibited by all agents which diminish or prevent sensory stimulation at the seat of inflammation. Further, all agents which prevent the abnormal dilatation and permeability of the vessels, and all which diminish the motility of the leukocytes, will also tend to prevent or lessen inflammatory reaction; and lastly inflammatory processes may be etiologically combated by removing or rendering harmless the pathogenic agents causing the inflammation.

"Astringents form a more or less firm and impenetrable coating on the surface of wounds of mucous membranes by coagulating the superficial layers of cells, so that the glands and lymph spaces are partially blocked, while the gland cells themselves are altered and their secretions checked so that the parts become dry.

"The astringents also exert some etiotropic actions, as they act on the exciters of inflammation, killing pathogenic microbes, and, what is probably even more important, precipitating or destroying the inflammatory cytolytic ferments and those substances which are formed during every cell

necrosis and which have the power of exciting inflammation.

"Silver nitrate when used in high dilutions acts as an astringent so that even in the case of a cauterization the traces of the caustic agent which penetrate into the underlying tissues act there as astringents. Consequently the curative effects of many of these substances depend on such a combination, of their caustic and astringent actions."<sup>1</sup>

The action of silver nitrate is due to the formation with the superficial tissue of an insoluble silver albuminate which, being thrown off, carries with it the bacteria entangled in the meshes.

"Salts of mercury form only soft or water soluble products; they produce no astringent effects whatever."<sup>1</sup>

When silver nitrate is used in from 2 per cent to 4 per cent solution its action is confined to the surface of the mucous membrane, since silver combines with protoid and sodium chlorid.

"As the organic silver compounds do not directly combine with proteoid and sodium chlorid compounds such as protargol, a solution of an albuminate of silver argonin, a compound of silver with casein and argenamin, (ethylene diamine silver phosphate), exert a more penetrating action."<sup>1</sup> The action of silver nitrate extends quite deep, since it forms easily soluble double salts of silver albuminate-sodium chlorid in the tissue.

"Silver nitrate acts as astringent, irritant or caustic, according to the strength and duration of its application. The surface first turns white, then gradually gray and black by the reduction to metallic silver and oxid."<sup>2</sup>

The silver nitrate solution should be applied to the conjunctiva of the everted lids by a cotton swab or brush. The simple instillation of the solution into the lower fornix with a dropper is ineffectual if not really harmful. The eye may be previously cocained if the patient so desires, but often the cocain solution causes more disagreeable symptoms than the silver solution. In the application of the silver solution the patient should look down while the physician holds the everted lids firmly to the face and the swab is made to brush lightly or heavily over the diseased surface, and especial care taken to apply it to the border of the tarsus nearest the fornix by lifting the tarsus with the swab. The lids are held open until a white film is seen to form where the silver is applied, the excess then immediately washed off with boric acid solution or salt solution. The lids

should then be replaced and the lower fornix again irrigated thoroughly. The amount of reaction the day following the treatment should be an indication of the efficacy of the treatment. If the treatment has not been too severe the white membrane will have disappeared completely and a soft red velvety surface be exposed. If the membrane has not disappeared or the surface tends to bleed easily the treatment has been too severe and should not be repeated until the membrane has exfoliated and the reaction subsided. It is better to apply the silver solution in the morning so that during the working hours the tears will irrigate and flush out the culdesac. At night the lid margins and skin of the lid should be covered with a nonirritating ointment, such as White's, or boric acid ointment, to prevent excoriation and fissures. This treatment should be kept up with only slight omissions for from two to three years.

If treatment of the diseases is not begun in the first stage or if for some reason the disease has not been arrested successfully we are confronted with a more serious problem. Pannus, ulcers of the cornea, and secondary infection are added to the structural and functional changes of the first stage and require strict attention. However, the same treatment should be applied, but the mechanical removal of large granules by expression or scarification may in certain instances be beneficial. Operation should not be radical, except in the most extreme cases. The lightest touch with sand paper or gauze dipped in 1:500 bichlorid solution sufficient to scarify but not destroy the tissue is all that is justified by results. This operation should be considered a hastening step in the treatment of the disease, not a substitute for the medical treatment. Corneal complications are admittedly stubborn in the second stage of trachoma because they tend to recur frequently but yield to treatment. The application of silver solution to the conjunctiva may be all that is necessary, combating secondary infection and the toxic effect of decomposing granulations. Usually it is better not to apply a dressing to the eye as it interferes with drainage of the secretion. Boric acid powder with iodoform powder in equal parts dusted onto the cornea gives excellent results. It may be applied within a few minutes after the application of the silver solution to the conjunctiva. Cauterization of corneal ulcers is seldom necessary unless active secondary infection has been implanted.

During practically the entire first and second

stages trachoma can be treated satisfactorily by the use of silver nitrate solution alone. A 2 per cent solution can be used as an astringent or as a cauterizing agent by varying the amount applied and the length of time elapsing before the neutralization with sodium chlorid or the washing with boric acid solution. When the disease is well under control and the symptoms have disappeared the silver solution may be discontinued profitably for a few weeks or a few months and a solution of zinc sulphate of from one to two grains to the ounce given for frequent instillation. A satisfactory method to follow is to stop the use of silver and substitute the zinc solution for one month in three. The zinc solution and ointment for the lids can be used by the patient at home with perfect safety.

Comparatively few patients in the north central states who have trachoma are situated so that they can not have frequent consultation and treatment. However they must be urged to pay strict attention to the treatment and instructed to report for observation at regular intervals. The blindness which follows trachoma is often preventable and every physician should make it his duty to help lower the percentage of blindness from trachoma in the west north central states. Patients seldom realize the danger and must be urged to persist in treatment even after their symptoms have abated and they believe themselves to be cured. The treatment commonly carried out is too desultory. The response to treatment is in proportion to the skill of the physician and no better piece of handiwork could come from his efforts than to handle a case of trachoma so that the misery of its sequelae are made as slight as possible.

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## PROBLEMS OF THE FALLOPIAN TUBE INFECTION PERIOD\*

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A pathological condition in the pelvis at a period of reproductive activity in women, is always a serious problem. Infections which reach the fallopian tubes by way of the vagina, or through the circulation are likely to produce ultimately a pyosalpingitis with a probable general pelvic peritonitis, together with many intestinal adhesions and a fixation of the uterus. There are many natural provisions against ascending infections. Several barriers have been provided to prevent bacteria from invading the peritoneal cavity through the natural channels. The vaginal secretions, the cervical opening, the sterile uterine cavity, the minute openings into the tubes, all protect against such infections. Even the ciliated columnar epithelial endosalpinx will at times temporarily arrest an invading infection.

The seriousness of an infection is much more readily understood if we recognize the cone shape structure of the tubes, for fallopian cone more nearly describes it, structurally, than fallopian tube. When the uterine ostium is once invaded, the infection passes freely to the fimbriated end where, through agglutination, nature generally makes her last effort to guard against a peritoneal invasion. The multiple nodular enlargements of the tubes, sometimes seen in abdomens that are opened, are but temporary blockings, caused by ciliated columnar epithelium. They make up the so-called latent cases that are sometimes lighted up during the congestion of menstruation, after curettement, or following a pregnancy.

It is essential to protect the endometrium of the uterus from the constant outpouring of pus through the uterine opening of an infected tube, in order that the function of menstruation may be safeguarded in young women. It is likewise necessary to conserve the ovary for its function of reproduction and for its internal secretions which enter so largely into the chemistry of the endocrine system. Infections which invade the tubes, in the majority of cases, are of gonorrheal origin and affect both tubes. While conservation of the reproductive function must always be guarded, infections which have extended to the fimbriated ex-

tremities and have sealed them, have invariably produced an obliteration of the lumen and have destroyed its patency. It then becomes the duty of the surgeon to remove the functionless bridge, that the uterus and the ovaries may be guarded against further invasion. When the tubes are removed, particular care is required to avoid disturbance of the ovarian circulation. This can best be accomplished by first severing the tube at the uterine cornu and then cutting it loose, keeping close beneath the tube, until the detachment is complete. In this way, only small vessels are divided and hemorrhage is slight.

In the recently developed non-operative determination of the patency of the fallopian tubes, by means of the intra-uterine inflation with oxygen, Ruben has devised a very simple method. It is applicable in a limited number of cases that have passed through a pelvic infection of gonorrheal origin. The method is not to be used in the presence of any acute or subacute pelvic infection, nor in the presence of purulent Bartholinian glands, urethra, vagina, or cervix.

### CONSERVATION OF FALLOPIAN TUBES.

It is apparent that conservative operation on the tubes has a very narrow field. Infections, other than gonorrheal, generally involve but one tube and it becomes our duty to conserve the remaining tube, even at the risk that it may sometime give trouble, in order that the function of reproduction may be preserved in these cases. Tubal inflammation occluding the distal end without being active, is the most frequent lesion calling for conservative treatment. The diseased portion of the tube may be removed. Kelly calls our attention to the possibility of cleansing a tube with some mild antiseptic, before returning it. The extra tubal inflammatory processes where the occlusion is produced from pelvic adhesions, pressure from tumors, and other inflammatory masses obstructing the lumen, are pathological conditions calling for conservative operative interference. Tubes damaged through gonorrheal inflammation producing a chronic pyosalpinx, offer little hope of conservative reparation. In mild cases, the inflammatory condition may pass off without destroying the lumen of the tube, and it is because of these cases, that many men are treating all cases expectantly. The majority of these infected women complain of severe pain in both iliac regions, there is considerable local reaction, the tubes are edematous and upon examination are

\*Prepared for the Minnesota State Medical Meeting, St. Paul, October, 1920.

found to be painful, enlarged, and tipped back toward the pelvic floor. The reactionary inflammation causes the tubes to become adherent to the adjacent organs. As the inflammatory process continues, the dense adhesions involve the ovaries, producing a disturbance of their circulation, which frequently results in cystic degeneration and destroys their second greatest function in young womanhood, the function of internal secretion.

#### COMPLICATIONS ARISING FROM DELAY.

We all have seen cases where the symptoms have abated and all evidence of infection has disappeared. It is likely that the discussion will bring out the citing of instances where women have given birth to children following gonorrheal salpingitis. These cases, however, are of the mild type, or probably unilateral infections. When suppuration persists, the formation of pus is a distinct indication for removal of the tube. Unless drained through vaginal puncture, it may rupture and evacuate itself through the rectum, the vagina, the bladder, the abdominal wall, or it may discharge into the peritoneal cavity. These fistulous tracts are sufficient sometimes to drain the abscess and give relief from pain. The relief is usually temporary and the patient may succumb to repeated infection, or the residue may become a pathological entity, which requires surgical interference. Many of these cases continue to discharge pus intermittently for years, each attack being characterized by pain, fever, and fresh inflammation, and the woman goes about in a state of semi-invalidism.

Clinical experience shows pelvic suppuration to be almost always in the tubes. In other than gonorrheal inflammation, the infection spreads by way of the lymph channels or the blood vessels in the cellular tissue of the broad ligaments. These vessels may transmit the infection to the tubes and ovaries, or the course of infection may be arrested by thrombic plugging of the vessels and result in a pelvic cellulitis. If the ovaries are to escape degenerative changes, and their function is to be maintained, their circulation must be guarded before their blood supply is destroyed. The frequency of cystic degeneration of ovaries after hysterectomy, is sufficient proof that the condition is brought about through disturbance of the circulation. The ovaries are of paramount importance for the general welfare of our patients.

#### SURGICAL TREATMENT.

Acute adnexal inflammatory conditions should always be treated expectantly. We have learned

that time alone sterilizes the tubal inflammation, and nature aids us to a considerable degree in making surgical intervention a comparatively safe procedure. In most cases, sterilization will take place within three months. No radical operation should be done during acute tubal infections, nor acute exacerbation of chronic inflammatory conditions. A leukocyte count will often help determine the activity of the infection, a high leukocyte count revealing a virulent pathological condition with which it is dangerous to interfere. Cases of active infection will frequently manifest a rising temperature following a vaginal examination. It is expedient to do a vaginal puncture to evacuate the pus, if it is found upon examination to be localized. Some of these cases will be relieved without further operation. Delayed cases which suffer from repeated attacks are often secondarily infected from the intestinal tract, and produce pathological conditions which make them very serious surgical cases.

When the disease has progressed to permanent obstruction of the tubes and has destroyed their patency, the tubes are of no further functional value. It is, therefore, conservative surgery to remove them, that the ovaries may be protected against cystic degeneration.

#### CONCLUSIONS.

1. It is of the utmost importance to conserve the ovarian function in young women who suffer from pelvic infection.
2. It is necessary to remove the pathologic tubes before their inflammatory product destroys the ovarian circulation.
3. Delayed operative procedures often make it a very formidable operation because of the extensive complications that intervene.
4. Many patients become invalids because nature has not been able to check the destructive process of an invading infection.





## A CASE OF PULMONARY INFECTION WITH A NEW SPECIES OF ACID-FAST ACTINOMYCETES\*

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The acid-fast actinomycetes are not common and therefore not as well known as other pathogenic varieties. They are, however, of great interest from the standpoint of bacteriology, since they furnish the closest contact between the true bacteria and higher fungi, being closely related to the tubercle bacillus in morphological and cultural characters, pathogenicity and serum reactions; and, second, from the standpoint of clinical medicine, since they produce infections which bear a great resemblance to tuberculosis, with which they may be confused, the confusion extending even to the microscopic examination of the sputum.

These infections differ from tuberculosis, however, in having a distinctly more unfavorable prognosis, the organisms being more virulent both for man and laboratory animals.

The case which we have to report is of interest because the condition was diagnosed during life; the organism was isolated in pure culture from the sputum and proved to be different from any of the recorded species; immunological studies were made and vacine treatment was tried.

The patient is a woman of nervous type, 31 years old, married, with two children. She complains of cough, periodic expectoration on lying down, and general weakness. About three years ago, following childbirth, she took cold and began to cough. She has never been well since, having frequent attacks of tonsillitis and a chronic cough. At first there was very little sputum; what little there was "appeared greenish and shiny, with a peculiar medicated odor." But about two years ago she began coughing up large quantities of sputum, a cupful or more during the day. The sputum was occasionally blood streaked. She gradually developed a goiter for which an operation was performed one year ago. Three months later she began to cough more and had severe pain in the right chest. There was fever for several days at this time and for several months there was a degree of fever every day or so.

The patient was first seen July 18, 1919. Physical examination at this time revealed nothing noteworthy save an area of impaired resonance with crackling rales in the right axillary region from the fifth to the eighth ribs. Roentgen screen examination showed slight thickening of both apices and small annular shadows near the hilum of the right lung. There were no areas that suggested massive consolidation or large accumulations of pus.

The laboratory findings were negative save for the sputum, to be described later. The temperature showed no abnormal variations during two weeks.

Intracutaneous tuberculin tests were positive both with Koch's O. T. and tuberculin prepared from tubercle bacilli treated with CO<sub>2</sub> under high pressure, according to the method of Larson, producing areas of infiltration the size of a half-dollar in forty-eight hours.

The sputum was examined for the presence of tubercle bacilli by the Ziehl-Neelson method. The examination revealed the presence of acid-fast branching filaments. For the most part these were isolated strands showing lateral branches at irregular intervals, but occasionally there was found a considerable mass of mycelium in which the central filaments were closely intertwined, the peripheral portions being irregularly arranged in a radial fashion, resembling somewhat the sulphur granules of ordinary actinomycosis. For the most part the filaments were quite uniform in diameter, although occasional fusiform swellings occurred; but definite clubbed extremities were never found. In addition to these structures there were many mycelial fragments of varying length, some showing a remarkable resemblance to true tubercle bacilli. The mycelium was not uniform in its acid-fastness, some strands taking the blue counterstain. Moreover, it was not so acid-fast as tubercle bacilli; for, if the 5 per cent hydrochloric acid-alcohol used as a decolorizing agent was allowed to act for a minute or more, practically all of the mycelium was decolorized. Several specimens were examined during the course of two weeks, and all showed the presence of this organism, although in some specimens they were much more numerous than others. There were numerous bacteria of various kinds in the sputum, and all attempts to isolate the organism by plating directly from the sputum were unsuccessful, all

\*Abridgement of paper presented before the Minnesota State Medical Association, St. Paul, October, 1920.

the plates being overgrown by spreading colonies of bacteria.

Two guinea pigs were inoculated intraperitoneally with sputum. These died after five and six days. Autopsy revealed small tubercle-like nodules scattered over the peritoneal surface, being most numerous on the under surface of the diaphragm and the surface of the liver and spleen. The omentum was shrunken to a thick mass in the upper abdomen, studded with nodules. A few flakes of fibrin were present on the peritoneal surfaces, and the parietal peritoneum in addition showed hemorrhages.

From the peritoneal tubercles removed aseptically and crushed, the organism was readily grown in pure culture.

In its cultural characters this organism resembles closely the organism of "ordinary" actinomycosis, producing a snow white, adherent growth on agar, a pellicle on broth and milk; gelatine is slowly liquefied and the casein in milk is peptonized. Media containing peptone or meat extract are turned a dark brown, a feature exhibited by many other actinomycetes.

Our strain is highly virulent for laboratory animals, rabbits dying in 48 hours after intravenous inoculation, and guinea-pigs about five days after intra-peritoneal injection. The virulence has remained quite constant after months of cultivation.

Having obtained a pure culture we prepared an antigen for immunologic studies. The organism was grown in flasks on broth containing 3 per cent each of dextrose and glycerine, until the pellicle broke, about 10 days. It was then heated to 60 degrees C. for one hour, and placed in Dr. Larson's apparatus under the pressure of a fresh tank of carbon dioxide over night. On releasing the pressure it was found that the masses of mycelium had disintegrated, forming a uniform suspension of mycelial fragments. The organism, however, still grew on subculturing, so the suspension was again heated to 65 degrees C. for an hour, and 0.25 per cent tricresol added. It was then found to be sterile.

Part of this material was used in this condition, while another portion was passed through a porcelain bougie, and the clear filtrate was used.

Skin tests were made with both of these antigens, injecting 0.1 cc of a 1-1000 dilution intracutaneously. That night the patient had a chill the temperature rose to 102 degrees, and she ached all over. The next day the temperature was nor-

mal. In spite of this severe constitutional reaction there was no visible reaction at the point of inoculation after 48 hours.

The antigen prepared as above proved nonhemolytic and not anticomplementary, and was therefore used for complement fixation tests with the patient's serum. The reaction was found strongly positive, the complement being completely bound using two drops of the patient's serum and two drops of the antigen, and the antishoop hemolytic system ordinarily used in our Wassermann tests. A similar test made with this antigen and the serums of twelve other persons gave negative results throughout.

As the mycelial fragments, after treatment with CO<sub>2</sub> under pressure, remained in suspension for some time, the antigen was also useful for agglutination tests. The tests were made by the macroscopic method, incubating at 55 degrees C. for an hour, and read after standing in the icebox over night. The patient's serum agglutinated completely in a 1-20 dilution, and partially at 1-100; a control serum produced no agglutination.

The antigen prepared as described above was used for vaccine treatment, beginning one week after intrautaneous injections. The vaccine was injected subcutaneously, given at intervals of 4 or 5 days. The first three doses were 0.1 cc, 0.5 cc, and 0.5 cc of the 1-1000 dilution; the fourth and fifth doses were 0.1 cc and 0.5 cc of the 1-1000 dilution, and the sixth dose was 0.1 cc of the 1-10 dilution. After the third dose there was a very slight febrile reaction and a small lump at the point of injection; otherwise, there was no reaction to the injections of vaccine.

After the last injection she returned to her home in another state. Her physician there was furnished with a supply of a vaccine, and the injections were continued for another month. After each injection there developed a very painful lump and the vaccine was discontinued for this reason; no constitutional reactions. The dosage was not further increased.

Letters received from the patient in January and October of this year indicate that the disease has progressed somewhat; the cough and expectoration continue, and on three occasions there have been hemorrhages from the lungs. Following these hemorrhages there has been fever, but at other times her temperature has been normal. She gained weight for a while and then lost twelve



pounds, but has been gaining weight lately. She has complained much of pain in the chest.

Aside from the injections of vaccine, the patient was placed on the usual tuberculosis regime, but otherwise no treatment was given. On returning to her home she again resumed her usual household work.

The organism which we have isolated resembles closely the acid-fast actinomycetes described by Eppinger, Aoyama and Miyamoto, Birt and Leishman, and others, but differs from those strains hitherto reported in its proteolytic activities as evidenced by the digestion of gelatine and casein. Because of the chalky-white appearance of the growth on media, we propose for our new species the name *actinomyces gypsoides*.

## THE VALUE OF CONSERVATIVE INTRANASAL DRAINAGE FOR CHRONIC EMPYEMA OF THE ANTRUM.

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The study of 100 cases of chronic empyema of the antrum furnished interesting data with regard to the value of the Krause antrum operation, or window resection. In all the cases studied the infection of the ethmoid or frontal sinuses, which may have existed previously, had cleared up and was not a factor in the infection at the time of the antrum drainage, in other words, the antrum infection was residual, the sinus acting as a reservoir.

In the routine examination of these sinuses it was found that diagnostic puncture is the only reliable means of diagnosis. The x-ray was a valuable aid but not always reliable; the same may be said of transillumination. Many of these patients did not have symptoms referable directly to the antrum, and statements with reference to the possible duration were inaccurate.

### TECHNIC

The diagnostic opening was enlarged under the inferior turbinate well toward the floor of the nose. In very few cases was it necessary to sacrifice turbinate tissue.

The after-treatment for the most part consisted of repeated irrigation and suction and simple air-

drying. No one particular irrigant was found to be of greater value than another; a mild alkaline solution seemed to be accepted kindly by the tissue. In the air-drying process the canula is inserted into the antrum and the membranous lining is dried with compressed air without irrigation. This seems to be a valuable procedure in many cases. In some cases in which the condition persisted after irrigation, improvement immediately followed the dry treatment. It would appear that the drying of the sinus discourages further formation of pus. In this connection the word "cured" means that the discharge has cleared up and local symptoms, if any, have subsided. In all probability a chronic sinusitis is never cured permanently; it is a well accepted axiom that once a sinus case, always a sinus case, in other words, the sinus once involved is always liable to flare up with repeated colds or any condition accompanied by a lowered resistance.

Of the 100 cases reviewed 47 per cent were cured, in the average case in thirty-two days. Seventeen percent were not improved; 6 per cent were finally operated on radically, either the Caldwell-Lue or Denker operation being performed. Thirty-six per cent were improved, but not cured.

Further analysis demonstrated the fact that in the cases in which the condition did not clear up readily an opening sufficiently large had not been made at the first operation. If the condition did not respond to such treatment it was usually found that definite pathologic changes in the membranous lining, polypoid degeneration, hyperplasia, and so forth, had taken place. A few of the patients who were improved but not cured might have made further progress had they remained longer under treatment. Their condition, however, is reported at the time of their dismissal.

### CONCLUSIONS

1. The analysis of these cases demonstrates that intranasal drainage in chronic empyema of the antrum is a safe and efficient procedure in 47 per cent of cases.

2. If adequate drainage and ventilation does not give satisfactory results in from three to four weeks more radical methods should be adopted.

3. Cases in which the membranous lining has undergone hyperplasia or polypoid degeneration will usually need more radical treatment.

4. Dry treatment, or air-drying, seems to be as efficacious as irrigation in many cases.

## TRAUMATIC INJURIES OF THE SPINAL CORD AND ROOTS\*

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When the spinal cord is completely destroyed at any level there develops a certain well known syndrome. This consists in the loss of all reflexes below the level of the lesion, lack of voluntary control of the bladder and rectum, absence of all varieties of sensation from nerves having origin below the injured segment, and total flaccid paralysis of muscles receiving nerve supply from below the corresponding segment. Further than this, there is a general belief, well supported by facts, that the cord when once destroyed never regenerates. These two statements have interjected much pessimism in the discussion of spinal cord injuries. This tendency has resulted in neglect of this class of cases to so great a degree that a paper seems justified, the purpose of which is to demonstrate that all patients presenting such a syndrome are not hopeless.

Most spinal cord injuries either die or suffer great disability on account of urinary infection or infection from decubitus ulcers. In a few rare cases the spinal lesion has even disappeared and the patient has recovered from the paralysis of the limbs, and yet there was disability on account of neglect of one of these factors. Therefore, more attention should be given to the prevention of these complications in any case whether we think recovery is possible or not. Both ulcers and urinary infection can be prevented. The use of the soft rubber catheter sooner or later results in disaster. When it is possible to empty the paralyzed bladder by massage or by waiting, it is best to do so. If catheterization is necessary, a highly polished silk catheter is less apt to do harm than a rubber catheter. In every case in our experience where the rubber catheter had been used there was infection. Continued use of the catheter usually resulted in increased infection and ultimate death. On the other hand, we have had cases that had never been catheterized where the bladder did not rupture because of this, and in course of time these patients developed a clean automatic bladder. Even if infection has developed, massage, internal ad-

ministration of acid sodium phosphate and urotropin often clean up this complication. When no improvement occurred with this medication, the use of salol and sodium bicarbonate was sometimes efficacious. Decubitus ulcers are due to trauma and infection in areas deprived of sensation. The patient having no sensation can not protect himself as a normal individual would; therefore, pressure or other trauma must be prevented by the attendant. Moisture of any kind predisposes to infection and ulcers; hence, keep the patient dry and clean; use oil on the skin. Denervated tissues do not ulcerate spontaneously, and animal experiments show that denervated tissue of almost any kind heal if protected from injury. The fact that we can not tell whether the syndrome of a complete lesion means permanent or temporary impairment of cord function emphasizes the necessity of the utmost general care in every case.

Injuries to the spinal cord may have a variety of resulting pathology, some destined to undergo spontaneous recovery, others requiring surgical assistance, and others destined to remain stationary. According to Frazier we may have any one of the following:

1. *Hematorrhachis*, that is, hemorrhage within the spinal canal, and either intradural or extradural.
2. *Hematomyelia*, or hemorrhage diffused, often in discreet areas into the substance of the cord.
3. *Contusion*, in the sense used by Allen. Allen defines contusion as the result of the impact without immediate physical solution of continuity, usually progressive and consisting of actual destruction at the time of impact, to which is added the secondary change due to the outpouring of serum and blood into the substance of the cord.
4. *Laceration* of the cord, either complete or partial. And I am inclined to add to these a fifth.
5. *Pure mechanical compression*.

While each of these types tend to bring about a syndrome of symptoms somewhat peculiar, yet the overshadowing syndrome in all or any may be that of complete transverse lesion. For example, in case of hematorrhachis early neurological examination may show progressive development of symptoms beginning with root-like symptoms, or even meningismus; yet usually before these cases come under trained observation the stage of general compression has developed. Careful examination may develop a syringomyelic type of disassociation of sensation, or even in hematomyelia and

\*Read before the Southern Minnesota Medical Association, Markato, November, 1920.



later the case may show the picture of a transverse lesion.

Contusion usually leads to progressive changes, but unfortunately, at the end of six hours these lesions are complete, and often then we are dealing with a true transverse lesion. Laceration of the cord leads to degeneration of the ascending tracts above the lesion and degeneration of the descending tracts below the lesion. These can be demonstrated histologically at the end of six months. Laceration of the cord is always accompanied by the condition known as "spinal shock". If the lesion is complete, spinal shock in man lasts forever. If the lesion is incomplete, then the spinal shock will pass away. When the spinal shock is gone, then the flaccid paralysis is replaced by the spastic paralysis. In animals, even with a complete lesion and so-called shock, this passes off and the animals are capable of walking reflexly. Compression of the cord may give a syndrome identical with that of a transverse lesion and yet recovery may take place when the pressure is relieved. Trauma, with its widely differing pathology of impact and its secondary sequences, may give a correct or misleading picture of complete transverse lesion. In addition trauma primarily affecting the spinal root, accompanied by contusion of the cord, may give us a deceptive picture of a transverse lesion. Injuries of the nerve roots, even of a severe character, are prone to undergo recovery. In cases of concussion or edema of nerve roots, recovery is to be expected, but spontaneous recovery tends to take place in complete laceration of the roots. The tendency of the roots to repair themselves is shown by the following case:

An avulsion of all the roots of the brachial plexus resulted in complete paralysis of the patient's arm. Return of function in one group of muscles occurred after sufficient time had elapsed to permit of the down growth of the neuraxes. This man was accidentally killed after two years and at autopsy fibres from the avulsed roots had found their way into the ulnar nerve, and it was in the muscle of this nerve supply that recovery had occurred.

The following case also shows how root lesions will recover and how they may simulate a transverse lesion:

A patient, name N. N., has been crushed under a stone weighing twenty tons. When released he was paralyzed from the waist down. The bladder and rectum were involved, together with complete loss of all varieties of sensation. There was a com-

pound fracture of the transverse and spinous processes of the first, second, third and fourth lumbar vertebrae. Infection complicated the picture. The patient was brought to Minneapolis in this condition, and we attempted to clean up the infection. After this had been accomplished, operation was done to explore the wound. At exploration no damage to the cord itself could be demonstrated. However, the cauda equina was partially, if not completely, severed, or rather pulpified by the numerous pieces of bone. The wound was finally mechanically cleaned, but no attempt was made at suture of even such trunks as were known to be severed. On account of the extensive laminectomy, a plaster cast was applied. The paralysis persisted, but the bladder and rectum soon came under voluntary control. During convalescence the atrophy of the legs became extreme in spite of massage and care, and for several days death seemed imminent from embarrassment of respiration. Treatment was persisted in, and at the end of two years voluntary motion had returned to every muscle except the adductor magnus of the right leg. In one year he was able to perform heavy labor in fact was occupied in driving spikes for the railroad with a ten pound sledge.

A rather rare example of a bilateral root lesion unassociated with any pathology of the cord is encountered in the following case:

J. S. was struck on the back of the neck by a falling tree. Paralysis of both arms gradually developed and finally became complete. No operation was done. This patient has made a partial recovery, in that he can voluntarily move all of his muscles, but all of them seem very weak, and there is a great deal of persisting atrophy that we have not been able to combat.

An almost exact converse of this is illustrated by another case, Case 4.

This man was shot at about the same level as the last case with an automatic pistol. He was for a time completely paralyzed. This paralysis must have been due to some temporary pathology, because he made a complete spontaneous recovery except in those muscles supplied by the sixth and seventh cervical roots. Exploration had shown that these roots were almost completely destroyed.

I again want to repeat that the severed root regenerates as does the peripheral nerve. If the sheaths of Schwann take a predominating part in the role of nerve regeneration and as the cord does not contain any cells of Schwann, it is to be expected that laceration of the cord would never repair; ever since the days of Trendelenburg we have had to agree to this latter statement, that such repair does not occur.

Frazier collected seven cases where the cord had been sutured, and says there have been undoubted cases in which the spinal cord has been completely

severed and subsequently sutured with the preservation of life on the part of the patient; but that the junction of the severed ends is never more than scar tissue is quite beyond question.\*

There seems to be at least two reasons why the cord cannot be sutured. First, it is impossible to bring nerve fibres in contact as all sutures show a wide zone of scar tissue. Second, the sheath of Schwann is absent in the cord, and there is almost convincing evidence that these are necessary for regeneration in presence of scar tissue. In section of the cord we are still dealing with an upper motor neurone lesion. That is, the fibres have intact ganglion cells in the cord connected to muscle end plates. Motion is preserved but is of a reflex character and out of control of higher centers. Yet animals with complete cord lesions may be said to walk reflexly. So in animals this reflex motion is of a different character than in man. In attempting to suture the cord the author united the anterior roots above and below a hemisection of the cord in ten dogs. The animals all for a time presented a paraplegia from which they soon recovered with more or less residual paralysis on the operated side. One of the animals made a seemingly perfect recovery at the end of seven months. At the end of this time the dog was chloroformed and the cord removed. It was so deformed by scar tissue that grossly the root anastomosis could not be found. However, cross sections above and below the hemisection were almost identical with the silver stain. Practically the motor tract had the same appearance on both sides. Longitudinal section through the cleft of the hemisection showed proliferating nerve fibres. It is to be expected that in seven months degeneration would be so far advanced that error from that source could be eliminated. It is with some hesitation that I report a single successful experiment, but it is with the hope that this may stimulate some one else to carry the test to the ultimate. I have several times considered the experiment in the human, but the cases I cleaned

up for operation began to show enough spontaneous improvement so as not to justify the procedure.

Compression is difficult to separate from contusion. In tumors we have a pure example of compression without the traumatic element. In fractures and dislocations there is always added some degree of contusion. However, as time goes on, in some cases the contusion disappears but the patient manifests the symptoms of a transverse lesion. A typical example of this was shown in a laminectomy where after removing a depressed spinous process infringing on the cord, recovery took place. To show how much compression of the cord may permit of recovery I will interject a case of spinal tumor. The tumor was a capsulated myeloma originating in the vertebra. Careful measurements were made at the time of operation. Before operation the patient had a typical syndrome of a transverse lesion. Three weeks after operation motion began to manifest itself. Six months afterwards the patient made a perfect recovery.

One case of a fracture dislocation of the third and fourth lumbar vertebra prevented symptoms of a transverse lesion. Reduction of dislocation was immediately done, and the patient subsequently secured the use of bladder and rectum, and at the present time can walk but has persisting double toe drop. That is, there is still complete paralysis of the sciatic roots on both sides. Sensation has not fully returned to the feet.

This brings us to the question of operation. It is important to remember that in every operation we do some damage. I have never made an exploration either in man or in animals that I did not leave behind me a legacy of scar tissue. Extreme delicacy in handling and an exact hemostasis have not entirely abolished this. Observation of the work of others leads me to believe that this is not entirely a personal equation. I feel then it is only justifiable to operate when the pathology we correct far outweighs the pathology we produce. On the other hand, the cord, it not itself traumatized, resists wonderfully well encroachment of surrounding scar tissue. I have removed cords from animals previously operated upon that were badly deformed with extraneous scar tissue, yet sections of these cords showed no actual destruction of nerve elements and this was confirmed by functional tests and physiological stimulation.

Taking up each class by itself let us see how

\*Myelorrhaphy: Ests, 1889; no motor return or bladder; died.

Briggs, 1898; function of muscles and bladder gradually returned.

Stillwell & Harte, 1902; partial bladder; patient walked.

Fowler, 1905; no improvement.

Shirres, 1905; early autopsy.

Solieri, 1908; autopsy; no nerve fibres regenerated.

Fontain, 1909; recovery of bladder.



far exploration is justified and when interference should be attempted. In hemorrhage we can remove blood clots and effect hemostasis, and by decompression allow escape of uncontrollable hemorrhage. In contusion of the cord Allen has made a remarkable contribution. He has shown that in contusion there is added to the original impact a secondary process in the escape of blood. That is, in six hours this may reach such proportion as to destroy the nerve fibres. Longitudinal median incision in the cord if done very early will arrest the secondary change by allowing escape of blood. Here the balance then is on the side of operation, but, unfortunately, I have never gotten a case early enough to permit of this, but it does not contraindicate operation.

Diffuse hemorrhage into the cord is not benefited by operation, according to Frazier. Our own experience certainly justifies the removal of foreign bodies producing compression. However, the time for this is not so clear. Added experience may permit some one to definitely formulate rules for a time for operation. So far, there has been very little mortality in our explorations. Two deaths have occurred in connection with cervical injuries when our patient suddenly died from liberating high intradural pressure. In this connection I am unfortunate in having ten deaths from crushing of the spine before we could bring the patient to operation. This gives a total immediate mortality of 12 out of 106 cases, and a subsequent mortality of 5 additional unoperated cases. In the late operative procedures there have as yet occurred no deaths.

#### DISCUSSION

DR. A. S. HAMILTON, Minneapolis: Dr. Corbett has been working on experimental nerve surgery for a number of years and this with his recent clinical experiences in the army entitles him to speak with authority on the important subject which he has just brought before us. We are faced with very unfortunate results in this form of surgery, and the unhappy experiences in a great many cases of severe injury to the cord have led to efforts to bring about a better treatment. It seems to me however that, in spite of the work done, the situation is about what it was a number of years ago. One must often give a positive opinion as to what should be done in a case of apparent severe injury to the cord and advice is very difficult. Of course, we all agree that if we have a badly crushed cord, operation is useless, but how is one to know that the cord is crushed? It has been stated that where there is complete loss of motion, of sensation and of the deep reflexes, we are dealing with a complete crush of the cord, but so many patients have gotten well, even after present-

ing such symptoms that the point is hardly worth discussing and we may dismiss it with the statement that it is absolutely impossible by any known neurological methods to determine absolutely as between a functional and an anatomical discontinuity of the cord.

In cases with total crushing of the cord, there is no possible hope unless the cord regenerates. Balance has insisted so strongly on the idea that no regeneration can occur in nerve fibers unless the nuclei of the neurilemma can proliferate, that we have come to accept it but it is a matter of opinion, difficult of absolute proof, and it may not be true. If it is true, we may as well accept at once the hopelessness of the situation in any complete cord crush because there is practically no neurilemma in the cord, nothing but a slight thickening which extends a short distance into the cord along some of the sensory fibers. But there is, as a matter of fact, some evidence that fibers do regenerate within the cord. A number of cases have been reported of tumors of the cord in which there has been found satisfactory histological evidence of new fibers being formed. If that be true, there may be some hope in these traumatic cases, otherwise there is none. But, be one's theoretical attitude what it may, Cole and Knapp have pointed out that in most of the surgery done, where any attempt has been made to bring the ends of the cord together and to restore function, the results have been bad. Dr. Corbett has reported a few cases where good results have been obtained, and among clinical cases that of Stewart and Harte, which I happen to have seen, is notable. The girl in this case, was shot in a quarrel with a gentleman friend and the bullet passed through her spine. She was operated upon and Dr. Stewart and other observers believed that the cord was totally severed. With great difficulty he brought the ends of the cord together. The girl was absolutely paralyzed for motion and sensation and had lost control of the functions of the bladder and rectum and there were no deep reflexes. The last time I saw her she was walking down the street and making fair progress, although she used a cane. It is a well known fact that one can get function quite happily in the cord with many of the fibers destroyed and neurologists explain such a case as the one referred to by saying that, though, doubtless, many of the fibers were destroyed, some of them must have remained.

Dr. Corbett has spoken of his experience with dogs. Dogs have had their cords severed and have walked again, but there is a probable material difference between a dog and a man in respect to this particular experiment, and sometimes the return of function in the dog happens so early after section that there could have been little or no time for regeneration in the cord. We may probably assume that some of the reflex paths in the dog are much more satisfactory than those supplied to man, so that the animal can walk again but man may not walk under the same circumstances.

It is often stated that if operation is to be of any value in a cord injury it must be done at a relatively

early period after the trauma, as otherwise the pressure of the hemorrhage and the edema will destroy even those fibers which may retain some vitality. It is well known however that in cord tumors, where great pressure has been exerted on the cord for sometime and where there is at least complete functional loss, an operation, with relief of pressure, may result in return of useful function and it does not necessarily follow, therefore, that, even after trauma, the pressure would be great enough to wholly destroy fibers which might have escaped in the original injury. Furthermore it is known that operation on a cord, even by the best man, often results at least temporarily, in an increase of symptoms and quite possibly in even some permanent loss. With this point in view and with the known fact that compression paraplegia may recover or at least improve even with the most advanced symptoms, it appears to me safest to assume a very conservative attitude and not to do an early operation in any case except those with reasonable evidence of bony fragments or of foreign bodies as a bullet, actually pressing on the cord or in those cases where progressive increase in the severity of the symptoms suggests a hemorrhage. In any case, whatever one does, one is likely to wish that the other course had been taken.

One can only hope that with persistent efforts in the investigation of this problem, such as Dr. Corbett has been making, we may ultimately reach a point where our diagnosis of the degree of destruction in cord injuries will be more accurate and the results of our treatment will be more happy.

DR. CORBETT (closing the discussion,): If I may take a minute or two to emphasize what I hinted at in my animal experiments, I will say that we have believed for a long time that when the cord was cut, no regeneration would take place. From the observations of Ballance and a great many others it is stated nerves will only regenerate through the agencies of the neurilemma canal. That statement is not true except in the presence of scar tissue. Our experience shows that regeneration of neuraxes can take place without the scar tissue. I am not willing to accept the regeneration of the cord as being perfectly hopeless, and it is for that reason I made these experiments of the anterior roots. It seems to me, if we can get a few neuraxes switched around or bridged widely enough to penetrate the roots that have the sheath of Schwan, if we can enter the cord where there is no scar tissue, regeneration must be possible. The study I have given to these animals bring back hope that we may yet regenerate the spinal cord.

The other purpose I had in presenting the paper was to show the impossibility of making a diagnosis of complete laceration of the cord, and that where a patient has had a complete laceration just as good care should be taken of that patient as possible so as to give him a chance for recovery. I have seen patients recover from spinal injury to die of a urinary infection or to die of decubitus ulcer infection, because the cases were thought to be hopeless and were neglected.





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## EDITORIAL

### THE SO-CALLED SHEPPARD-TOWNER BILL

This Bill "mothered" by the Children's Bureau has been introduced in two sessions of Congress. It was passed by the Senate, was reported out of the Committee on Interstate and Foreign Commerce in the House of Representatives, and died in the Committee on Ways and Means. The official title of the Bill is "A bill for the protection of maternity and infancy and providing a method of co-operation between the government of the United States and the several States." This Bill will appear again in the present session of Congress and its passage has already been advocated by President Harding in his message. A Bill was introduced into the Senate and House of this state to provide for state activity in this line of public health work, thus taking advantage of the provisions of the Sheppard-Towner Bill. This Bill was reported out favorably from the Committees, carrying no appropriation from the state.

Briefly, the provisions of the national Bill are as follows. The purpose is to establish cooperation between the federal government and the several states in improving the care and providing instruction in the hygiene of maternity and infancy. The Chief of the Children's Bureau as executive

officer is to be assisted by an advisory committee to consist of the Secretary of Agriculture, the Surgeon-General of the United States Public Health Service, and the United States Commissioner of Education. The amount appropriated consists of \$480,000 each year, \$10,000 of which would be paid annually to each state for administering the work.

Further appropriation is authorized to be divided, among the states carrying on this work, on a per capita basis. This is \$2,000,000 for the fiscal year ending June 30th, 1921. This sum is increased by \$400,000 each year for the ensuing five years. Any state may create a state board of maternal and infant hygiene or establish a division in its state board of health to administer the provisions of this Act. These state boards shall have all necessary powers to cooperate with the federal board. Not to exceed 5 per cent of the amount appropriated is to be used for administrative purposes by the federal board. Any state desiring to secure the benefits of this Act must submit detailed plans to the federal board for approval. These plans shall include those of administration, instruction through public nurses, consultation centers, etc., division of medical and nursing care for mothers and infants at home or in institutions. It further provides that not over 25 per cent of the sum granted to each state may be used to provide popular non-technical instruction on the hygiene of infancy, maternity, etc., through state universities, land grant colleges, or other public educational institutions by means of extension courses.

These Acts should be carefully considered by the medical profession as they vitally affect the relation of the medical profession to the public. Maternal and infant welfare and hygiene have been much neglected in the public health and welfare activities of this country. The furtherance of public health and welfare is the chief object of the medical profession and it should, therefore, cooperate in any attempt to accomplish this end. It is however to be kept in mind that anything which reacts to lower professional standards or efficiency reacts to the detriment of public health and welfare. Anything which improves the medical profession and raises its standards and efficiency will have a very favorable effect on public health and welfare. If lay boards through governmental agencies can improve the medical profession and widen its scope by improving the methods and opportunities of service to the public, a great good would be ac-

complished. If, on the other hand, conditions are created which for any reason make the profession less attractive to independent men of intellect, the reverse will be true. No one can deny that this is another step in the direction of state medicine. It is a matter of grave concern and for careful consideration by both the medical profession and the lay public. If governmental agencies could have unbiased and well considered advice from carefully chosen members of the medical profession as well as from lay individuals, a sane progress in these matters would be much more certain. F. L. A.

### VITAMINES AND INFANT FEEDING

It is generally recognized that mother's milk is the ideal for infant feeding. Owing to the variations in the composition of mothers' milk it seems evident that the infant is not tied down to an absolute quantitative formula, but permits of fairly wide variations in the relative proportions of the constituents of milk.

There may be two reasons for this. One is its ability to store certain elements, such as iron, for instance, which is very deficient in mothers' milk, but which is stored in the liver of the newborn in sufficient quantity to tide over a few months on an iron-free diet without noticeable anemia. Another possibility is that it may absorb selectively relatively more of those ingredients which it most needs.

An infant fed on breast milk has what might be called a mild diarrhea. Its food is of such a nature that 100 per cent might be digested and absorbed so that the feces would consist of nothing but bacteria and intestinal secretions, but actual fact, the bulky feces show a considerable proportion of undigested food, or at least, unabsorbed food. We might then compare the nutrition of an infant to that of a marine plant whose growth is only limited by that substance which is deficient in amount (and which is fixed nitrogen) in case of the plant. We do not know the total composition of human milk, and therefore we cannot modify cows' milk so as to be exactly like any sample of human milk, and, owing to the large variation of the composition of human milk, it is clearly impossible to make modified milk conform closely to the majority of samples of human milk. What we want to do is to take an average figure of human milk and adopt a single formula for modified milk, which is of the same approximate composition as the average human milk in so far as known constituents are concerned. In regard

to the minor constituents which are known qualitatively but not quantitatively, we might add a slight super-abundance of these.

The vitamins are constituents which have never been isolated, but may be determined roughly quantitatively by feeding experiments on small animals. We do not know exactly how many vitamins there are, but we know that there are three types, called A, B and C. Type A includes a growth promoting substance, and anti-ophthalmia substance, and an anti-rachitic substance. Whether all these substances are the same, need not worry us unduly. We know, for instance, that cod liver oil promotes growth and cures nutritional ophthalmia and rickets. Other products containing vitamin—A might not cure rickets in a spectacular manner simply because of the lesser concentration of the vitamin. For instance, Zilva reports that some samples of rank, dark-colored cod liver oil contain 270 times as much vitamin—A as is contained in butter fat. The usual dose of cod liver oil is three teaspoonfuls a day. It would therefore require about 4000 teaspoonfuls of cream to give the same dose of vitamin—A which is clearly impossible to administer. Therefore, we cannot say with certainty that cream and spinach are lacking in the anti-rachitic vitamin.

The statements that phosphorous cures rickets are also open to quantitative objection. There is often enough anti-rachitic vitamin in infants' diet for slow recovery from rickets without the use of medicine. Therefore, isolated instances of recovery after the administration of phosphorous would only be conclusive in case the diet was absolutely freed from vitamin—A. Phosphorous is entirely absent from all our food, and therefore it cannot be maintained that those infants who do not get rickets are protected by phosphorous in their food. Phosphorous is taken in food in the form of phosphoric acid, which is harmless. Phosphorous is a deadly poison, and many infants have been killed by a mistake in the amount of phosphorous administered.

That cod liver oil cures rickets has been repeatedly proved. The most spectacular experiment is that of Drs. Park and Macollum, who showed that cod liver oil administered to rachitic rats caused a marked deposit of calcium salts in the rachitic ends of the femur, in three to five days.

Class B of vitamins includes the growth promoting substance and an anti-neuritic substance. Whether these are the same has been disputed, but



they occur together in our foods. Nutritional polyneuritis or beri-beri, as it is called, occurs even in breast-fed infants in countries where beri-beri is common among adults. The growth promoting substance is probably often deficient, as shown by the increased growth rate of under-nourished infants, observed by many workers on administering vitamin-B in concentrated form.

Vitamine-C cures and prevents scurvy. It is perhaps the best known in its affects. Scurvy is the best known deficiency disease, in fact, its cause is so well known that it has been largely eliminated among infants. When patent baby food were first put on the market, scurvy became noticeably increased. The same was true when the processes of pasteurization or boiling of milk was first introduced. It has become, however, common practice to administer vitamin-C with artificial feeding.

To sum up, the infants diet should contain a sufficiency or a super-abundance of vitamin A, B and C. Vitamin-B is the most stable and may occur in sufficient quantity in cows' milk, provided the cow is fed on a diet containing it in sufficient quantity, but when cows' milk is diluted, as is usually done in modifying it for infants' feeding, there is very likely to be a deficiency of it.

Vitamines A and C are very sensitive to oxidation with the oxygen of the air. This oxidation probably ceases entirely when they are absolutely dry, but increases with the increase in moisture, temperature and sunlight. If oxygen is absent they can be heated to much higher temperatures without destruction of the vitamins.

It is not at all certain that vitamins from different sources are exactly the same. We merely know that they are similar in effect. For instance, the vitamin-C in the citrus fruits is much more resistant than is vitamin-C from another source. The vitamin-A in spinach and cod liver oil is said to be more resistant than that from other sources, but this may not be true. Vitamins are destroyed gradually, and since vitamin-A is so much more abundant in cod liver oil than in butter, for instance, even after nine tenths destruction it might still remain in relatively high concentrations. As a practical matter, the infant can usually be supplied a sufficient quantity of vitamin in the butter fat in the diet, especially if the cow is given sufficient amount of green feed or leaves that have been dried in such a manner as to preserve the grain

color. In case this has not been attained, it may be administered in the form of powdered spinach, mixed with water and fed with a spoon or added to the milk. Powdered spinach also contains vitamin-B.

Vitamin C is best administered in the form of the juice of citrus fruits, sweetened with sugar, and diluted, in case the infant demands a lowered acidity. Sodium bicarbonate may also be used to lower the acidity. Calcium carbonate will do this, and also add calcium salts to the diet. Yeast may be used as a source of vitamin-B. Fresh yeast has a pleasant taste, but dried yeast varies in taste with the mode of drying and the taste is not usually considered attractive.

J. F. McC.

### COLONEL SMITH

A man named Smith; a very usual name, but this particular Smith, Colonel Henry Smith, formerly of the British service in India, and now of England, is a good example of a man finding a beaten path to his door because he can do one thing better than any one else.

The actual location of the path was in India where Colonel Smith performed an enormous amount of surgery, undoubtedly more than any surgeon who ever lived, including over 50,000 cataract extractions. This enormous experience has enabled him to perfect a technic which in his hands has proven the most satisfactory in existence, and which has been adopted by his numerous pupils in this country and throughout the world.

Men from the larger cities all over the country have thought it worth while to visit the Colonel in India. One of these, Dr. W. A. Fisher, of Chicago, who has probably had a greater experience with the Smith technic than anyone in America, and who is an ardent admirer of Colonel Smith, recently received a letter in which the Colonel said he was going to visit America. Societies all over the country were notified and many extended him invitations to visit them and demonstrate his technic. He accepted every invitation and has visited Columbus, Dayton, Cincinnati, Dallas, Philadelphia, Buffalo, Chicago, Boston, Swonsocket (now made famous), St. Paul, St. Louis, Kansas City and the Pacific Coast. At Boston he read a paper on "Night Blindness" before the Annual Meeting of the American Medical Asso-

iation, calling attention to the predominating element of malingering in the cases reported. At the annual meeting of the American Academy of Ophthalmology he presented a paper on "After-Cataract."

The Colonel's visit to St. Paul, under the auspices of the Minnesota Academy of Ophthalmology, seemed in the nature of an endurance test. Seventy-eight cases were assembled at St. Joseph's Hospital by Dr. John C. Harding, all of which were operated in rapid succession. In Colonel Smith one observed a man of large frame, the gray hair and bushy gray moustache indicating his near approach to the three score year mark. A man of few words, he went about his work, smoking a cigar most of the time, apparently oblivious to the ash, and with a familiarity almost bordering on contempt, at least for usual aseptic precautions.

To the majority of the onlookers the Colonel was convincing. It is to be hoped that the cases operated will be recorded and reported.

While Colonel Smith is supposed to have retired, he admits he has not given up "this sort of thing," which is the purely scientific phase of medicine, and which affords the charm to the practice of the profession.

Unfortunately journalism is suffering at present from a nation-wide printers' strike. The June number of Minnesota Medicine was two weeks late in appearing on this account, and this issue is late for the same reason. The timely appearance, in fact the appearance at all, of the next issues depends entirely on the strike. We hope our readers will bear with us in what is an unavoidable situation.

## NEWS OF THE HOSPITALS

Dr. Carl C. Chatterton, St. Paul surgeon, has been appointed surgeon-in-chief of the Hospital for Crippled and Deformed Children at Phalen Park. Dr. Chatterton succeeds the late Dr. Arthur J. Gillette.

Dr. E. O. Giere, chief of staff of the St. Paul Hospital, opened his offices on May 16th. John E. Haugen, of the same institution served as chairman for the National Hospital Day Committee of the State. Seventeen student nurses were recently graduated. The address was given by Dr. Arthur Sweeney of St. Paul.

The graduation exercises of Mounds Park Sanitarium, St. Paul, were held on April 27th when eighteen student nurses received their diplomas from Dr. Robert Burns of St. Paul. On May 2d the Alumnae of the Sanitarium held a gathering at The Commodore, St. Paul.

Improvements now under way at the Aberdeen Hospital, St. Paul, will make the institution a three hundred bed hospital.

Dr. Frank Billings, of Chicago, one of America's foremost surgeons, was a recent guest at the City and County Hospital, St. Paul.

In conjunction with National observance of Hospital Day, the Swedish Hospital of Minneapolis broke ground for their new Nurses' Home.

Henceforth Lymanhurst Hospital, Minneapolis, will be operated as a health center for children, according to Dr. F. E. Harrington, City Health Commissioner.

Miss Susan Holmes, superintendent of Nurses at Abbott Hospital, and Miss Bertha Mattick, of Hillcrest Hospital, were among the recently elected directors of the Minnesota State Registered Nurses' Association.

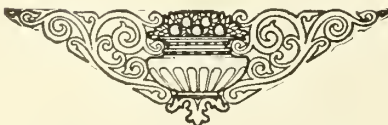
The Norwegian Lutheran Deaconess Hospital held graduation exercises on the evening of May 12th when fourteen student nurses received diplomas.

St. Barnabas Hospital, Minneapolis, has installed a new eighteen ton ice machine manufactured by the Bilter Company, of Milwaukee.

St. Mary's Hospital, Minneapolis, recently entertained the graduating classes of St. Margaret's Academy and St. Catherine's College, educational institutions of Minneapolis and St. Paul, respectively.

Dr. Kano Ikeda, formerly of St. Barnabas Hospital, Minneapolis, has been appointed full-time pathologist at the General Hospital of that city. Dr. A. E. Goedel was recently absent from the hospital to attend the funeral rites of his father who died in Indianapolis. On each Tuesday a Clinical Pathological conference is held from 12:30 to 1:30. Physicians of the city are urged to attend. Commencement exercises were held on May 27th at the Women's Club, Minneapolis. Dr. R. O. Beard delivered the lecture. The Hospital has been repainted throughout, and the Nurses' Home refinished.

The Luverne Hospital, Luverne, Minnesota, will hereafter be under the management of Drs. Wright,





C. L. Sherman, E. O. Thorson and J. B. Stevens, with Mrs. W. A. Wright serving as superintendent. The institution was formerly operated by the late Dr. A. E. Spaulding.

The Nurses' Home of St. Joseph's Hospital, Brainerd, Minnesota, was recently destroyed by fire. The loss was estimated at \$5,000.00.

The 1921 legislature has authorized a large bond issue for the erection of Glen Lake sanatorium. Equipment for the building will come from a tax levy. The sanatorium recently opened an addition which will accommodate about ninety patients. A Heliotherapy department will be a feature of the new sanatorium.

#### LIBRARY SERVICE IN THE HOSPITALS OF ST. PAUL.

1. What is it?
2. Why is it?
3. How is it done?

Books for the sick, Why not? It would be a wise man and a cunning one who could nicely discriminate between books as a library product and as a tool for the social worker. Who, having ever been in a hospital in any capacity, will ask "do patients read, is this service needed?" One cannot forget the eager replies to one's "Would you like a book or a magazine?" their relief, surprise, their gratitude as one made the rounds? What does the quick flocking of nurses about the book cart mean? "My patient wants——" the orderlies come by, one checks a book against the laboratory. There are always off-hours, you know. One superintendent in answer to my request for a list of titles to be used as supplementary reading for her training classes remarked; "I want my nurses to appreciate the board field of nursing; to realize the many opportunities of the nurse of to-day." She herself had been a Red Cross nurse overseas, had worked with the repatriates at Evian and later had been loaned by the Red Cross to the Polish government. "I want them to know something besides private nursing, they must read——," and we noted titles.

Who can estimate the value of books in hospitals? There is a Swede who but lately came to this country, and chafes at hospital existence. If only he were back in his own country! His Sweden would make him well again. His eagerness to get at Swedish books was pitiful, it was one of his own kind. There is the pale little youngster of ten with both legs in plaster casts, tuberculous hip who had never been to school. For him an interested volunteer is recruited, who will go regularly to read to him and incidentally teach him to read and write. And what do these patients read? Wholesome, light, entertaining stories that will make them forget themselves. Nothing too academic. "Good literature," merely as such, has no place in the hospital library. Picture-puzzles have their place for the nerve patients.

St. Paul began its library service in hospitals on February 1, 1921 under the joint auspices of the Amherst H. Wilder Board and the Public library.

The liaison between these two agencies should have a word of comment, marking, as it does, a new field for charity organizations, the Wilder Board being one such. A new field, and a legitimate one, as was decided after discussion, too often closed to libraries and hospitals though lack of funds, experience, or both. Briefly, the St. Paul hospital service is as follows. Twice as many books as beds for each hospital, are kept permanently at the hospitals. The patients come and go but the books remain. Twice a week personal distribution of books by the hospital librarian. The graph shows the field which includes the following hospitals: Bethesda, City and County, Merriam Park, Midway General, Mcunds Park Sanatorium, St. Joseph's, St. John's, St. Luke's, St. Paul's, the Miller Hospital, and the Public Health Service Hospital 65. That means a public of 2,000 otherwise practically unserved by the library in the very heart of the community.

It is not out of place here to speak of the Public Health Service Hospitals, scattered about the country for the ex-service men. While there are social workers, the Red Cross, federal vocation assistants and interested outsiders by the scores in these hospitals, there is no government provision for books and their distribution. The American Library Association is generous in its help if there is supervision of the work. In Public Health Service Hospital No. 65, it has been possible to assist the patients to do some interesting reference work. Few of these men are in bed and of those who are, many are surgical cases and can read the second day or so after the operation. They read everything from history and travel to a treatise on the Steel Square, from highly technical Hiscox to Alger. A list of note-book jottings shows requests for poetry, real estate law, Drummond's "Habitant," history (ancient and modern), Jane Grey, the National Geographic, James' Psychology, Darwin's Descent of Man, Biography of Wilson, book on letter-writing and small dictionary, a first book on the automobile, bee-keeping, tree-grafting, a history of the Black Prince (had seen the B. P.'s cave near Bordeaux). A new man in his first experience of the library says "Books? Yes, have you got any foreign history or the Greek classics?" A cook of Co. D, 27th Engineers, the men who rebuilt the bridge at Chateau Thierry under German fire lies flat on his back two years and a half after the armistice. "Want another book?" "Yes, one just like this," and he reaches for his other one, Sir Philip Gibbs'. Now it can be Told. "That's a good one," he added, "I read it all yesterday." A man of no education! A Greek, his seven years in this country spent in the mines in Montana and Alaska, rejects any profers of a book. Later in front of the shelves, he vouchsafes, "Oh, here's where your books are." "You're a Greek, aren't you," came the answer. "Yes, have you got any Greek books?" "Yes," and half in jest Sophocles' Antigone was poked at him. "Sophocles," he murmured, "But I know him—but it's English, isn't it? There aren't any more like

him. The young Greeks aren't like those old ones." A nerve case committed to bed asks for something on the theory of music, harmony and counter point. To the vocational teacher go books on design, book-binding, book rugs, etc. The incidents are as numerous as are the patients, and more enlightening than statistics.

Hospital statistics, by nature of their being, must remain approximate rather than precise. A book charged to a ward may be read by every person in it and often is. Magazines are not counted at all in the record of circulation. In this Public Health Service Hospital No. 65 the average during the past thirty days has been about 150 patients. Our figures show that 400 books is not too high a figure for the same length of time. Easily half of that number are non-fiction. In the other hospitals the average is lower. It works out that about every third person takes a book. Some are too old, some too young, some are dying, some have forgotten their spectacles, some ought not to read. But even including all the non-readers it is true that about every third patient wants to read or will read if properly approached.

And where will this end? Only the books and the limitations of the person in charge will answer that. To human service there is no end.

Miss Perrie Jones, Hospital Librarian.

## OBITUARY

Thomas Leger Firth Armitage, Princeton, Minn. Graduate of Medico Chirurgical College, Philadelphia, 1892. Died June 3, 1921. Dr. Armitage was a successful popular physician of the old school, highly esteemed in the locality where he had lived and practiced for twenty years. Member of the A. M. A., American Health Association, American Association for Advancement of Science, Royal Society of Arts, London, Fellow Hon. Council, North British Academy of Arts, England, and a 32d degree Mason.

E. S. Frost, M. D., Minneapolis, Minn., born at St. John, Canada, April 11, 1843; graduated from the University of Pennsylvania, 1868. Died May 3, 1921.



## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### SOUTHWESTERN MINNESOTA MEDICAL SOCIETY.

The Southwestern Minnesota Medical Society held its 37th semi-annual meeting at Fulda, Minnesota, on May 12th. The attendance was the largest in years, fifty-two physicians and surgeons being present. Dr. F. G. Watson, of Worthington, acted as chairman and Dr. E. G. McKeown, of Pipestone, secretary. The program included the names of several well known physicians of Minnesota. A banquet was served in the evening. The next meeting of the society will be held at Worthington.

### NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Northern Minnesota Medical Association was held on May 24th and 25th, 1921, at Detroit, Minnesota. This, the first meeting of the Association, was attended by some one hundred and twenty-five physicians, and the register included the names of about fifty ladies. The program included the names of many well known physicians of the state, and the subjects of the papers were representative of the various specialties.

The public meeting following the banquet was addressed by Drs. Sweeney and Dodson. The idea of allowing the public to benefit from addresses by members of the profession is in keeping with the trend of the times, and the practice might well be adopted by all medical conventions.

This association meets once a year, and the next meeting will undoubtedly be in the latter part of May, 1922.

The following officers were elected:

Dr. C. O. Estrem, Fergus Falls, President; Dr. Roy E. Swanson, Alexandria, Vice President; Dr. W. L. Burnap, Fergus Falls, Secretary-treasurer and Chairman of Program Committee.

Board of Censors: Dr. O. O. Larson, Detroit; Dr. O. F. Melby, Thief River Falls; Dr. O. E. Lokken, Crookston.

### MINNESOTA STATE MEDICAL ASSOCIATION

The annual meeting of the Minnesota State Medical Association will be held at Duluth August 24th to 26th inclusive. The Council will meet at 10 a. m. August 24th, and the House of Delegates at 2 p. m. on the same day. The Scientific Program will occupy August 25th and 26th.

The secretary of the proper section should be communicated with in regard to papers to be presented.

#### Surgical Section—

Dr. J. T. Rogers, Hamm Bldg., St. Paul.

Dr. T. L. Chapman, Secy., Fidelity Bldg., Duluth.

#### Medical Section—

Dr. S. H. Boyer, Lyceum Bldg., Duluth.

Dr. C. B. Wright, Secy., Syndicate Bldg., Minneapolis.



## OF GENERAL INTEREST

Dr. Arthur A. Kahala, of Erskine, attended the surgical clinics held at Rochester during May.

Dr. Hugh Reynolds, of Hibbing, is taking a post-graduate course in medicine in Minneapolis.

Dr. L. E. Claydon, of Red Wing, has recently returned home from a six months trip around the world.

Dr. Franklin W. S. Raiter, of Cloquet, is in Chicago, where he is recuperating from his recent operation.

Dr. Carl L. Larsen, of St. Paul, has returned to Vienna for further study of diseases of the special senses.

Dr. J. L. Mulder, of Chaska, has moved to Cavalier, N. D., where he will continue in the practice of medicine.

Dr. Wallace H. Cole, of St. Paul, was married on June 4, 1921 to Miss Mary Crunden, of St. Louis, Missouri.

Dr. B. S. Bohling, of Sandstone, spent a month in Chicago recently in the study of medicine and hospital work.

Dr. B. R. Karn, of Ortonville, has been taking a special course in medical and surgical work in Minneapolis the past few weeks.

Dr. George Earl, of St. Paul, has recently returned from Philadelphia where he spent several months in postgraduate surgical study.

The degree of Doctor of Laws was conferred upon Dr. C. H. Mayo at the commencement exercises of Northwestern University, June 15.

Dr. W. A. Lee, of Fergus Falls, has been spending the past few weeks in Chicago where he has been taking post-graduate work in medicine.

Dr. Crandall, formerly associated with Dr. Oliver, of Graceville, has located at Browns Valley where he has purchased the practice of Dr. McGearry.

The third annual meeting of the Association of the Resident and Ex-Resident Physicians of the Mayo Clinic was held in Rochester, May 18 and 19.

Dr. A. J. Paulson, of Thief River Falls, returned recently from Minneapolis, where he attended a physicians and surgeons short course at the University.

Dr. Walter Timme, attending Neurologist of the New York Neurologic Institute, gave a Mayo Foundation lecture April 29; his subject was, "Endocrine glands."

Dr. F. J. Souba, of Minneapolis, announces that he is severing his connection with the Sivertsen Clinic, and is opening offices at 600 Physicians and Surgeons Building.

The Union Clinic, of Willmar, Minnesota, announces the addition to its staff of Dr. H. V. Hanson, who will specialize in diseases of the eye, ear, nose and throat.

Dr. C. Curry Bell, who has been at the City and County Hospital, St. Paul, as chief surgical interne

for two years, has opened his office at 1014 Lowry Bldg., St. Paul.

Dr. P. C. Pilon, of Paynesville, sailed for Europe May 15th. He will tour Belgium, France, Switzerland and Germany, and plans to study in the large hospitals of the countries he visits.

Dr. Walter E. Scarborough, of Waterville, is making plans to locate in Elysian where he will engage in general practice after he returns from Chicago where he will take a technical course in surgery.

Dr. W. B. Heagerty, of Mazeppa, has sold his practice to Dr. L. F. Sutton, of St. Paul. Dr. and Mrs. Heagerty have gone to California for a visit, and expect to look for a new location in the west.

Dr. R. E. Farr, of Minneapolis, presented papers before the Spokane Medical Society on June 28th; the Seattle Surgical Society on June 29th, and the Tri-State Medical Association on June 30th, at Portland, Oregon.

Dr. D. P. Maitland, of Jackson, who has been spending the greater part of the winter in California, has recently returned to his home after a post-graduate course in medicine in Chicago. He will resume his practice at Jackson.

Dr. H. E. Robertson, director of the department of pathology and public health at the University of Minnesota, has been transferred to the graduate school at the Mayo Foundation, Rochester. Dr. Robertson will be professor of pathology at Rochester.

Dr. W. J. Gamble, of Rochester, has been in Washington, D. C., where he received special instruction in eye, ear, and nose work. He will interest himself in this special field when he takes up his new duties in government health work, at Minneapolis.

Dr. W. J. Mayo and Dr. C. H. Mayo have recently received notification that Honorary Fellowships in the Royal College of Surgeons of Ireland will be conferred upon them as soon as they can attend the ceremony which will be held in the College Hall.

Dr. H. B. Weinburgh, of Waterville, has returned after a year's absence spent in post-graduate work at various hospitals, the past month having been spent at the Mayo Clinic. He has made a special study of diseases of the eyes, and will add this to his general practice.

The Watonwan County Medical Society held its regular summer session in May at Madelia. The meeting was attended by practically all of the members of the society. Dr. A. F. Schmitt, of Mankato, visited the meeting and gave an interesting demonstration of x-ray work.

Dr. Victor C. Vaughn, Dean in the Medical School of the University of Michigan, Dr. J. M. T. Finney, Professor of Clinical Surgery, Johns Hopkins Medical School, and Dr. Frank Billings, Professor of Medicine, Rush Medical College, recently visited Rochester to observe the work of the Mayo Foundation.

Sir Wilmot Harrington, Chairman of the Committee on Medical Education of the University Grants Committee, and Sir Walter Morley Fletcher, Secretary of the Medical Research Council, of London,

guests of the Rockefeller Foundation, visited the Mayo Foundation and the Mayo Clinic April 26 and 27.

Dr. M. C. Linden has finished a year as chief medical interne at the St. Paul City and County Hospital, and is associated with Dr. Bevan in Chicago. Dr. Linden will devote himself to surgery and the medical internship just completed, together with a year previously spent with Dr. Le Count, of Chicago, which was spent as fundamental training.

At the commencement exercises of the University of Minnesota the degree of Master of Science in Surgery was conferred upon the following Fellows in the Mayo Foundation: L. P. Bell, J. M. Hayes, E. M. Johnstone, G. D. Mahon, A. E. Osterberg, F. R. Sanderson, and G. E. Sutton. Miss Winifred Ashby received the degree of Doctor of Philosophy.

Dr. Walter R. Ramsey, of St. Paul, has sailed with his family for Europe. The doctor will attend the second International Congress for the Protection of the Children, which will be held at Brussels, July 18 to 21, 1921. The subject of the paper which Dr. Ramsey will read at this meeting is "What are the most important means for the protection of infants against tuberculosis".

Dr. H. G. Irvine of Minneapolis recently attended the meeting of the American Dermatological Association at Swampscott, Mass., and the A. M. A. at Boston. He read a paper before the Section on Dermatology and Syphilis entitled "Two Hundred and Fifteen Cases of Syphilis After Five Years." Dr. Irvine was elected vice chairman of the section for the ensuing year.

Dr. W. J. Mayo has recently returned to Rochester after three weeks' absence attending meetings. He delivered lectures before the medical alumni of the State University of Iowa, the Fourth Judicial District of the Illinois State Medical Society, a joint meeting of the International Medical Society and Surgical Society at Washington University, and the St. Louis Medical Society.

The State Board of Health announces the discontinuance on July 1, 1921 of the Pasteur Institute which has been located on the University Campus at Minneapolis since 1907. The diagnosis work for the detection of rabies in animals will be continued under the Division of Preventable Diseases, University Campus, Minneapolis, and the State Board of Health will furnish physicians and health officers a list of the commercial houses which furnish anti-rabic vaccine, upon request.

The reason for the discontinuance of this service is the fact that the expense of maintaining the institute has been greater than would seem justified by the few number of cases in the state within the past three years. The preparation too of anti-rabic has so developed that the vaccine is at present being prepared and sold at a price by approximately a dozen commercial houses with satisfactory results.

Dr. W. J. Mayo delivered the Henry Jacob Bigelow Medalist Address before the Boston Surgical Society

June 6th at which time he was awarded the Bigelow Gold Medal. The Henry Jacob Bigelow trust fund was established in 1915 by Dr. William Sturgis Bigelow, of Boston, in memory of his father. The income is used by the Boston Surgical Society to award medals to persons who have made valuable contributions to the advancement of surgery in this country or in other countries. Dr. Mayo is the first person to receive the Henry Bigelow Medal.

Dr. Frank Whitmore, of St. Paul, has recently returned from a few months stay in Vienna where he took advantage of the clinics in nervous and mental diseases. He reports Vienna has hitherto been a neglected field for post-graduate study in nervous diseases. After spending three months in the Nervenlinik under Wagner Von Jauregg Dr. Whitmore was impressed with the amount of diversity of the clinical material and his excellent method of presenting it. It must be remembered, however, that psychiatry is an exceedingly abstract subject and unless one is able to understand both German and the Viennese patois the course may be unsatisfactory in the fact that Wagner himself speaks very little English. Freud and his students are rather outside the pale of the University courses, but their mode of teaching and way of approaching the study of abnormal psychology is so interesting that one is well repaid for spending some time with them.

## NEW AND NON-OFFICIAL REMEDIES

During May the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

### The Gilliland Laboratories:

Acne Mixed-Vaccine-Gilliland

### Hoffman-LaRoche Chemical Works:

Pituglandol

### Lederle Antitoxin Laboratories:

Cholera Vaccine (Prophylactic)-Lederle

Plague Vaccine (Prophylactic)-Lederle

### H. A. Metz Laboratories: . . . . .

Silver Salvarsan

Silver Salvarsan 0.05 Gm. Ampules

Silver Salvarsan 0.1 Gm. Ampules

Silver Salvarsan 0.15 Gm. Ampules

Silver Salvarsan 0.2 Gm. Ampules

Silver Salvarsan 0.25 Gm. Ampules

Silver Salvarsan 0.3 Gm. Ampules

Seydel Manufacturing Co.:

Guaiacol Benzoate-Seydel

Yours truly,

Secretary,

PHARMACY AND CHEMISTRY.

**Silver Arsphenamine.**—Sodium Silver Arsphenamine.—The sodium salt of silver-diamino-dihydroxy-arseno-bronze, containing approximately 20 per cent of arsenic and approximately 15 per cent of silver. The action and uses of silver arsphenamine



are essentially those of arsphenamine (see New and Nonofficial Remedies, 1921, p.41). Its claimed advantage over other arsphenamine preparations is said to be due to the silver which improves the chem-therapeutic index. In the presence of organic diseases of the heart, aneurysm, aortitis as well as other parenchymatous diseased conditions of the glandular structures, silver arsphenamine should be used with great caution and in small doses. The dose of silver arsphenamine is from 0.1 to 0.3 gm. for adults. To administer silver arsphenamine the product is dissolved in sterile distilled water without application of heat and without application of heat and without shaking and then diluted with 0.4 per cent sodium chlorid solution to make 20 c. c. per 0.1 gm. of silver arsphenamine (Jour. A. M. A., May 7, 1921, p. 1312).

**Suprarenalin.**—A brand of epinephrine, N. N. R. (see New and Nonofficial Remedies, 1921, p. 107). Marketed only in the form of Suprarenalin Solution.

**Suprarenalin Solution.**—One thousand parts contain suprarenalin sulphite equivalent to one part of suprarenalin in physiological solution of sodium chlorid without addition of other preservatives Armour & Co., Chicago.

**Sterile Ampules of Benzyl Benzoate.** H. W. D. O. 5 Cc.—One cc. contains 0.5 c. c. benzyl benzoate. H. W. & D. (see New and Nonofficial Remedies, 1921, p. 61) diluted with olive oil. Each ampule contains more than 1 c. c. Hynson, Westcott & Dunning, Baltimore, Maryland.

**Silver Diarsenol.**—A brand of silver arsphenamine, N. N. R. (see Jour. A. M. A., May 7, 1921, p. 1312). Silver Diarsenol is marketed in ampules containing respectively 0.05 Gm., 0.1 Gm., 0.15 Gm., 0.2 Gm., 0.25 Gm. of silver diarsenol. Diarsenol Co., Inc., Buffalo, N. Y. (Jour. A. M. A., May 14, 1921, p. 1353.)

**Mercurochrome 220.**—Soluble.—The disodium salt of dibromo oxymercury fluorescein, containing 23 to 24 per cent of mercury, Mercurochrome-220 Soluble is a strong and rapidly acting germicide. It is active in urine 1: 1,000 solution, killing *Bacillus Coli* and *Staphylococcus aureus* in this medium in one minute. It penetrates the tissues readily. The drug is tolerated in a strength of 1 per cent by the bladder, renal pelvis and urethra. A 2.5 per cent solution applied to the anterior urethra causes only temporary discomfort. The toxicity, when tested by intravenous injection into rabbits, is rather high. Mercurochrome-220-Soluble has been used in cystitis, urethritis and in chancroidal ulcerations also in affections of the eye and ear. Hynson, Westcott & Dunning, Baltimore, Maryland. (Jour. A. M. A., May 21, 1921, p. 1403.)

#### PROPAGANDA FOR REFORM

**Aspirin or Acetylsalicylic Acid.**—For many years the Council on Pharmacy and Chemistry, and the Journal of the American Medical Association have been urging physicians to avoid using proprietary nonproprietary name. Two substances have been

especially referred to in this connection, hexamethylenamine and acetylsalicylic acid. Many years ago, hexamethylenamine was found to be an effective therapeutic agent, especially as a urinary antiseptic. Since it was a well known chemical it could not be patented. A commercial firm, however, seized the opportunity and coined the name "urotropin" and advertised it. As a result the proprietary name became so fixed in the minds of physicians that some still use it in their prescriptions instead of hexamethylenamine. Acetylsalicylic acid was patented and the trade name "Aspirin" coined for it by the predecessors of the Bayer Company. During the patent monopoly both physicians and the public became familiar with the term Aspirin. When the patent expired, physicians continued to prescribe Aspirin, even though the drug was available under its proper name, acetylsalicylic acid. Having acquired the rights to Aspirin, the Sterling Products Company, under the name of "The Bayer Co.", has during recent years attempted to impress on the lay mind that there is no satisfactory Aspirin, except Aspirin Bayer. Recently a suit has been decided in which the Drug Company from selling acetylsalicylic acid under the name aspirin. The court holds that, since the public knows the drug as Aspirin only, the pharmacist may sell any brand of acetylsalicylic acid to the public when Aspirin is called for. On the other hand, manufacturers, pharmacists and physicians know the term acetylsalicylic acid and know that the term Aspirin was coined by the Bayer concern and hence, when a physician writes for Aspirin in his prescription only the Bayer product may be supplied. Physicians should avoid the term "Aspirin" and instead prescribe "acetylsalicylic acid" (Jour. A. M. A., May 14, 1921, p. 1356).

**Eruption after Luminal.**—Luminal has been reported by two authors as producing an exanthem simulating urticaria: by two others an eruption simulating measles; by three, as simulating scarlet fever; and by two, as an unclassified drug eruption (Jour. A. M. A., May 28, 1921, p. 1517).

**Tekarkin.**—Many physicians have received a sixteen page pamphlet "Therapeutic Leaves." "Therapeutic Leaves" purports to be a periodical, published as "a medium for the dissemination of knowledge pertaining to therapeutics." Actually it is an advertising medium dealing with the products of the National Bio-Chemical Laboratory "Osmo-Calcic Solution," "Tekarkin" and "Osmotic Mangano-Potassic solution." These three preparations are said to be the formulas of Edward Percy Robinson, who lives in Mount Vernon, N. Y., and has an office in New York City. They are used by Dr. Robinson in the treatment of cancer. A package containing about 65 minims of Tekarkin and one ounce each of the other preparations sells for ten dollars. Most of the material in "Therapeutic Leaves" is a rehash of four papers published by Edward Percy Robinson in the New York Medical Record. In these Robinson advanced the theory that cancer is caused by an

excess of sodium chlorid in the blood and tissues, and that it can be cured by administering a solution of potassium nitrate. Toweever, "Homemade solutions", says Dr. Robinson, "are apt to be disappointing," and hence a solution of this chemical is sold as Tekarkin. This dilute potassium nitrate solution sells at the rate of sixty-seven dollars an ounce. At one time Dr. Robinson specialized in "facial contouring." Except for the articles that have been published in the Medical Record, literature does not indicate that Edward Percy Robinson can lay claim to special knowledge of or skill in the treatment of cancer (Jour. A. M. A., May 28, 1921, p. 1514.)

**Vaccination against Influenza:**—Prophylactic vaccination against influenza was practiced extensively during, but mostly following, the recent epidemic of the disease. In some districts stock cultures were employed; in others a culture of the strain or strains isolated during the epidemic, and in still others a mixed vaccine. McCoy presented his impression, as gained from the uncontrolled use of these vaccines, that while therapeutically they might be of value in the prevention of influenza, yet in every case in which they were tried under perfectly controlled conditions, they failed to influence either morbidity or mortality. In an elaborate study, Jordan and Sharp conducted observations on approximately six thousand persons. About one half of these were vaccinated with a saline suspension of a standardized mixed vaccine; the remaining half were not vaccinated. The influenza attack among the vaccinated numbered 4.1 per cent; among the unvaccinated the morbidity from this disease was 4.8 per cent. (Jour. A. M. A., May 28, 1921, p. 1503.)

**Electrargol Omitted from New and Nonofficial Remedies:**—Electrargol—a preparation of colloidal silver—was admitted to New and Nonofficial Remedies in 1914. In 1918, Fougere & Co., was advised of unwarranted claims which were being made for Electrargol and notified that the product would be omitted from New and Nonofficial Remedies unless a thorough revision of the claims was made in a reasonable time. As the reply of Fougere & Co. indicated that a genuine effort was being made to comply with the request of the Council, Electrargol was retained for the 1919 edition of the book. A reply was received from Comar & Co., in 1919. This reply was a refusal, with one exception, to modify the claims objected to. In view of this refusal to modify the claims, with one exception, the Council directed the omission of electrargol from New and Nonofficial Remedies (Abstracted from Reports Council on Pharmacy and Chemistry, 1920, p. 58).

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

F. J. HIRSCHBOECK,  
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THOMAS A. PEPPARD  
LA SALLE BLDG., MINNEAPOLIS

#### THE PATHOGENESIS OF ACUTE LEUKEMIA:

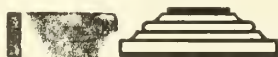
Report of a case of acute myeloblastic leukemia with the association or complication of Vincent's angina. Maurice Packard and Edward P. Flood (Am. Jour. Med. Sc. Dec. 1920). A case is reported in detail, with the clinical history, the clinical, pathological findings and the social service investigations. The finding emphasized is the presence of the spirilla and fusiform bacilli in the stained smears of the mouth lesion. The authors are impressed with the the infectious like type of onset and course of the disease.

The contention that leukemia is a disease of the blood has been discarded practically since Neumann in 1870, showed the marrow lesions in leukemia. The exciting cause, however, of the bone marrow and lymphoid tissue involvement still is obscure.

Warthin thinks an argument against infection is the widespread occurrence of leukemia in animals, corresponding more particularly to a neoplastic growth. However, the peculiar remissions which occur so frequently do not correspond to the usual course of a tumor. Occasionally, also, we have bona fide cases of spontaneous cure according to the authors. No specific organism has ever been isolated, and yet there is a great deal of evidence that the basic factor in its production is an infection.

Cabot reports a case of the development of the disease in a nurse while nursing a leukemic patient, and on two occasions epidemics have been reported—one in Austria in 1905, and one in France in 1912—although in the latter case the evidence is not impregnable. Leukemic mothers have given birth to healthy children. It is hard to establish also as to whether the infection in the mouth is due to a secondary invasion or whether it is primary. Rotky, in 1900, stated that the blood in leukemia has no agglutinating power to bacteria, explaining the apparent incapacity for the production of antibodies, and the lack of resistance in leukemic patients, to otherwise harmless infections. Sondern feels that in a number of instances Vincent's organisms might have been the exciting factor. In twenty-two cases he found the organisms, and in two cases he is convinced that it preceded the leukemia. He reports two recoveries, in which nine years elapsed in one case before the blood returned to normal, and five years in another. The writers report that they occasionally see severe lymphemias which recover, and they hesitate to give a hopeless prognosis.

The authors do not quote Dr. Head's masterly





article on acute lymphatic leukemia presented in a recent number of this Journal, in which he cites a case in which the Vincent organism was found.

When recovery follows after a supposed case of acute leukemia, the question of a correct diagnosis is not incontrovertible.

F. J. HIRSCHBOECK.

**THE EFFECT ON BLOOD PRESSURE AND THE NON-PROTEID NITROGEN IN THE BLOOD OF EXCESSIVE FLUID INTAKE:** Joseph L. Miller and J. L. Williams (Am. Jour. Med. Soc. March, 1921) Mohr, in Von Noorden's clinics, thought that a reduction in the daily output of urine below 1200 c. c. often led to nitrogen retention, and that the maximum nitrogen elimination was obtained with a daily secretion of 1500 c. c. Von Noorden urged that this optimal output of 1500 c. c. per day was an ideal to be attained.

Clinical cases of nephritis have been more intensively studied recently, particularly by Foster and Davis. They found that when the urine output was reduced below 1000 c. c. nitrogen retention resulted, and when the urinary secretion reached 2000 c. c. daily the nitrogen output exceeded the intake.

Minkowski called attention to the fact that uric acid elimination was increased materially by drinking water freely.

Miller and Williams have performed some careful experiments on patients to note the effect of increasing the fluid intake to a very high point, by the use of the Rehfuß tube with duodenal instillations. Observations were carried out on three patients, one a typical case of chronic gout of ten years duration, the other two, cases of hypertension—one with a very slight and one with a very decided increase in the non-proteid blood nitrogen. Neither patient had edema, and the elimination of water through the kidneys was satisfactory. During the period of observation the patients were on the hospital nephritic diet, with about 50 or 60 grams of proteid per day. Protocols of the three patients are published in all minutiae, and their conclusions are that large amounts of fluid may cause a very decided increase in the blood pressure, depending upon the promptness with which the kidneys function in excreting the enormous amount of water. They found the treatment to be without any apparent influence on the urea nitrogen in the blood, but in two of the three cases the uric acid in the blood was definitely lessened. This was probably entirely due to the treatment, as following the discontinuance of the water instillations there was an increase to the previous levels fairly promptly. Estimation of the nitrogen output in the urine during the period of observation was not determined.

F. J. HIRSCHBOECK.

**SACCULAR ANEURYSM OF THE DESCENDING THORACIC AORTA:** Ernest S. Du Bray (Am. Jour. of Med. Soc., March, 1921).

**Occurrence:—**

Aneurisms of descending aorta are least common

of all aneurisms, only 3 cases out of 64 autopsies at Johns Hopkins (Osler).

**Diagnostic Difficulties:—**

3 groups of descending thoracic aneurism.

1. Symptoms only—no phys. signs or signs not characteristic.
2. Cases suggesting malignant growth.
3. Obscure chest symptoms not suggestive of aneurism or tumor.

**Anatomical Considerations:—**

Aneurisms descending aorta frequently silent because of position.

2 groups of structure involved which give clinical evidence.

- I.
  - a. Spine, vertebrae and spinal nerves.
  - b. Lung, pleura and bronchi.
  - c. Trachea and Oesophagus.
- II.
  - a. Pericardium and heart.
  - b. Other great thoracic vessels (Pulmonary A. and V.)
  - c. Stomach.
  - d. Thoracic Duct.
  - e. Diaphragm.

**Rupture of Aneurisms in General:—**

In 110 aneurisms of descending aorta,

15% unruptured at death.

66% ruptured.

Slightly more liable to rupture than aneurisms elsewhere. (Arnold).

Most common termination of these aneurism is rupture into left pleural cavity.

Erosion of vertebrae in 26 out of 75 cases.

External tumor in only 6 out of 75 cases.

Clinical Diag. missed in 50%. (Wilson).

**Hemoptysis:—**

Case with copious and numerous hemorrhages with death delayed. (Clark).

**Autopsy:—**

Heart displaced to right—Left chest—abundance of clotted blood and separated serum.

Right lung—moderate grade emphysema.

Left lung—some compressed—point of rupture posteriorly at middle.

**Mechanism of hemorrhage:—**

1. Direct—from sac into air passage.
2. Indirect—result of pressure on air passages.
3. Passive congestion. (Hall).

**Pain:—**

Prominent symptom. extraordinarily severe.

Nocturnal exacerbations, does not respond to medication.

3 types.

1. anginal.
2. due to pressure.
3. neuralgic.

(esp. when spine is eroded).

**Mechanism of pain.**

1. Increased tension of walls, due to stretching of nerves in the aorta.
2. Pressure pain with coexisting inflammation. Digitalis often augments pain by increasing force of left ventricle and by raising arterial tension. (Oliver).

**Cough and Dyspnea:—**

Nearly constant features of aortic arch involvement less constant in descending aorta.

**Bronchorrhea and Bronchiectasis:—**

Due to pressure on main bronchus.

THOMAS ALBERT PEPPARD.

**THE WHITE ADRENAL LINE (SERGENT); IT'S CLINICAL SIGNIFICANCE:** Williard Kay and Samuel Brock (*Am. Jour. Med. Sc.*, April, 1921) The authors believe that the white adrenal line of Sergent is a local vasomotor disturbance residing in the skin, which has no specific relationship to adrenal gland activity. This observation was made after the careful study of 255 cases of normals and individuals sick with various conditions, upon whom they made numerous tests. Their reasons for assuming that the test is not specific for adrenal activity are:

(a) It's independence of blood pressure, acute fatigue, and other signs of deficiency of the adrenal bodies.

(b) On account of its frequent occurrence in normal individuals and diseases definitely unassociated with hypoadrenia.

(c) It's reappearance in spite of the persistent general manifestations of adrenalin administered subcutaneously.

(d) It's peculiar association with scarlet fever.

For these reasons they do not believe the line has the clinical significance attributed to it by the foreign writers, although they do not believe that any of the hypotheses evolved up to the present time establish the exact mechanism of this peculiar vasomotor phenomenon.

F. J. HIRSCHBOECK.

**THE ABSORPTION OF ACACIA FROM THE PLEURAL CAVITY OF NORMAL AND TUBERCULOUS RABBITS:** H. J. Corper and O. B. Rensch (*Amer. Rev. of Tub., Mch.*, 1921, Vol. 5, No. 1). Feeling that the mechanism of the production of tuberculous pleural effusions and empyemas is far from being understood, experiments were conducted to investigate particularly the immunological factors contained therein.

Paterson found that normal guinea pigs gave no pleural response to intrapleural inoculations of tubercle bacilli and that tuberculous guinea pigs developed serous pleural effusion when so treated. He concluded that tuberculous pleural effusions are the result of infected allergic pleura.

Previous investigations of Corper and Rensch did not substantiate this theory, so the present study using a colloidal substance resembling in many particulars the proteins of pleural effusions, was done in order to supplement the previous work. Thirty-seven rabbits were used. The point to be determined was whether the absorption of 7 percent acacia in saline solution was influenced by the previous sensitization of the animals by tubercle bacilli or by the presence of tubercle bacilli in the acacia solution itself when administered intra pleurally to

rabbits either normal of previously sensitized.

There was found to be no difference in the absorption of 7 percent acacia in saline solution with or without virulent tubercle bacilli, after intrapleural injection in normal and sensitized rabbits which tends to substantiate the previous observation that the tendency to pleural effusion is no greater in sensitized rabbits which have been given intrapleural injections of virulent tubercle bacilli.

Sensitized rabbits are not more prone to develop tuberculous pleural effusion than normal rabbits.

These findings do not agree with those of Paterson who used guinea pigs. This may account for the different findings. Further observation is necessary.

EVERETT K. GEER.

**BLOOD SUGAR REGULATION AND THE ORIGIN OF THE HYPERGLYCEMIAS:** Einar Langfeldt (*Univ. Phy. Inst. Christiania, Jr. Bio. Chem. Vol.* 46, No. 2, April, 1921). Glycogen Formation and Glycogenolysis.

Normal blood sugar concentration is from 0.09 to 0.10 percent with a physiological latitude between 0.07 to 0.11 percent. This blood sugar concentration is constant in normal individuals. Normal feeding does not cause any change. By administering glucose the concentration is increased rapidly within a few minutes, whereafter it quickly decreases to normal. It is agreed that the pancreas is necessary for glycogen formation in the liver.

Experimental work in normal dogs shows that alimentary hyperglycemia gives a rapid increase with a maximum in about one hour followed by a rapid fall. Glucose normally is rapidly converted into glycogen.

Postmortem and in vivo transformation of glycogen into glucose occurs as the result of a diastatic enzyme present in the liver.

Further experimental work has clearly demonstrated that small amounts of acids by mouth as well as by transfusion of the liver caused glycogenolysis, which was followed by hyperglycemia and glycosuria. Also that an increase of nitrogen in concentration in the blood of portal veins in depancreatized animals produced a heavy glycogenolysis, due to the failure of neutralization of gastric juice by alkaline pancreatic juice in these cases. Also in these dogs (depancreatized) the secretion of gastric juice itself, caused by giving water in bouillon, was able to produce a considerable hyperglycemia.

## II. Conditions of Action of Liver Diastases.

The following were proved by experiment:—

1. Pure diastase (free from chlorides) has no hydrolytic effect on glycogen in distilled water.
2. Phosphate diastase shows optimum activity at the pH 6.2 too far on the acid side to be important.
3. The optimum of the chloride diastase is found at pH 6.8.
4. The optimum action of the diastase after addition of adrenalin lies more on the alkali side.



5. Thyroidine alone does not effect the diastatic activity nor do the extracts of anterior or posterior lobes of hypophysis.
6. However simultaneous addition of adrenalin and thyroidine have very strong effect.

### III. Theory.

The hydrogen ion concentration of the tissue is probably a little less alkaline than pH 7.33 at 37°C, but still on the alkaline side of neutral. Under normal conditions the liver always discharges the same quantity of glucose.

The hydrogen ion concentration of the tissues is to the alkaline side. The optimum of cl. diastase is at neutral at 37°C. Therefore the blood sugar concentration when acids are given by mouth, the liver transfused, or by influence of gastric juice in depancreatized dogs is explained.

The second way in which hyperglycemia may arise is by displacement of the optimum of the liver diastase to or close to the hydrogen ion concentration of liver tissue. Such a displacement takes place under the influence of adrenalin or, in a higher degree, by simultaneous influence of adrenalin and thyroidine.

Adrenalin alone when much diluted is inactive, but is very active when thyroidine is added. This is shown clinically by the inactivity of subcutaneous injections of adrenalin in thyroidectomized dogs.

The third way in which a hyperglycemia may arise is by a lack in the formation of glycogen, such as takes place in pancreatic diabetes. In experimental diabetes there is not only a lack in glycogen formation but also undoubtedly an increased glycogenolysis in the liver on account of the absence of the neutralizing pancreatic juice.

ROBERT HELM KENNICOTT.

## SURGERY

### SUPERVISORS:

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### OBSERVATION ON CANCER OF THE RECTUM:

A. E. Wells, (Surg., Gynec., and Obst., 1920, 71, 472). Observations were made by the author on fifty-three patients most of whom were treated at the Hartford Hospital in the last twenty years. Twelve of this number came under his personal care. The patients were almost equally divided as to sex.

Figures argue that syphilis is not a cause of cancer. The greatest incidence of the disease occurred between the ages of sixty and eighty; the youngest patient was twenty-two. A diagnosis of cancer of the rectum at twenty-two might seem suspicious, yet it was proved beyond reasonable doubt. Another patient, male, aged thirty-one, had a tumor just within the anus involving the anterior and lateral walls of the rectum. A modified Kraske operation was done,

the posterior wall of the rectum not being removed. In this way it is possible to avoid serious secondary stricture which always results when an end-to-end anastomosis is made at a point where the peritoneum covers only one side or none of the rectal wall. This patient was alive and well seventeen years after operation.

Mayo, in 1917, described the removal of localized papillomatous tumors of the large bowel and rectum by linear incision through the wall of the bowel by the abdominal route. Rowley, in 1914, removed through the anus by conservative methods a papillomatous tumor in a patient sixty years of age. Bevan describes a method by which he removes the coccyx and splits the rectum posteriorly from the anus to a distance of four inches. The tumor is removed by cautery. Several patients on whom this operation was performed are alive and well two and four years later.

It is evident, however, that before conservative surgery can be undertaken the location of the growth and the area involved should be determined accurately. In order to discover whether such a cancer is localized or not, the cystoscope as suggested by Hepburn may be used. A very perfect picture of the growth may be obtained, especially if the rectum is filled with water as in examination of the bladder.

The principal symptoms in these patients were pain, blood in the stools, loss of weight, obstruction, diarrhea, foul discharge, obvious tumor in the rectum, acute obstruction, incontinence of feces, piles urinary retention, and so forth. In six cases acute obstruction was the first symptom.

Colostomy is considered advisable, as it not only relieves obstruction, but also decreases the irritation of cancerous ulcer. A source of poisonous absorption is removed by draining the dilated colon proximal to the growth. Apparently inoperable growths occasionally become operable following colostomy and the operation should not be dreaded so much as previously. The procedure of choice is to make the opening almost as high as the navel, leaving a good loop of sigmoid and bringing the gut straight through the middle of the left rectus muscle.

In fourteen of the fifty-three cases radical surgery was attempted. Three patients operated on by the sacral route and one by the abdominal route made operative recoveries. Five operations combining the abdominal and sacral routes in two stages resulted in recovery. In five the two routes were combined in a single stage operation and all the patients died as a result of the operation. K. M. Koons.

**TUMORS OF THE KIDNEY:** A Hyman (Surg., Gyn., & Ob., March, 1921.) In a series of forty cases of renal tumor, thirty-eight were malignant, the remaining two benign in character and confined to renal pelvis.

Hypernephroma was present in twenty-eight cases. It was most frequently found in the fourth and fifth decades. Its location, contrary to the former conception, was more often in the center or lower pole.

A peculiar characteristic in this series is the tendency of the tumor to break into the renal vein, occasionally extending into the vena cava. Metastases are usually multiple, secondary growths being found in the long bones, the bones of the skull and in the lungs and liver. The brain and spinal cord are not infrequently involved. These metastases may occur early or as late as ten years after nephrectomy.

The three cardinal symptoms of this type of renal tumor are first: hematuria, intermittent in type with a rather lengthy period between attacks, present in from fifty to seventy percent of cases; second: pain, which may be the initial symptom in from thirty to forty percent of cases; third: tumor, which is present in eighty-five percent of cases. General systemic manifestations are noteworthy in that they are of a much later development, coming on years after initial symptoms.

The diagnosis of this condition is greatly aided by cystoscopic, renal function and radiographic examinations which should include pyelograms and radiographs of the entire skeleton and lungs to determine presence of metastasis.

Treatment of this condition is nephrectomy at as early a date as is possible. The type of operation depending on the size of the tumor may be either trans-peritoneal or lumbar. The results in this series were a post-operative mortality of five percent in twenty nephrectomies; one death in eight exploratory operations. The percentage of cures after a period of three and a half years was thirty-three and a third percent.

Mixed tumors, eight in number, occurring for the most part in the early years of life under six years of age were composed of epithelial cells, muscle fibers, smooth and striated, cartilage, fat and bone. Clinical symptoms were primarily the large tumor, sometimes filling the entire abdominal cavity; pain and hematuria. Early nephrectomy is the only hope of cure.

The third type in this series, adeno-carcinoma, is of a more malignant variety, lasting only months instead of years. Pain is more constant, hematuria more pronounced and chæxia appears earlier. Of the two cases of this series, one died within a year, the other being alive and in good health after a year.

Tumors of the renal pelvis are rare. The papiloma, benign or malignant, does not infiltrate the kidney but are implanted along the ureter bladder. Symptoms in general are renal tumor, hydro-nephrosis or hema-nephrosis. Diagnosis is obtained by microscopic examination of catheterized specimen, demonstration of implantation of tumor in bladder or distortion of pelvis as shown by pyelography. A single case of this type in this series was treated for papiloma of the bladder. The kidney condition was not diagnosed until post mortem.

The last case of this series was one of angioma of renal pelvis. Clinical symptoms were intermittent hematuria with lumbar pain of long duration. At operation entire pelvis and calyces were filled with

the tumor. Nephrectomy was done with uneventful recovery.

In conclusion, of the total series of thirty-eight cases, eleven were inoperably malignant, twenty-seven nephrectomies with two operative deaths; twenty-three and three-tenths percent have passed the three and a half year period; fifty-eight percent died within two years after operation.

C. K. WILLIAMS.

**LINES OF ADVANCE IN THE SURGERY OF BREAST CANCER:** W. S. Handley (Brit. Med. Jour. 1921, 1, 37). Stiles showed that cancerous lymphatics are widely diffused through the breast. He emphasized the necessity of wide removal of pectoral fascia and deprecated the removal of an unnecessary amount of skin. The operation suggested by him and practiced by Cheyne from 1892 onward was much superior to that of Halstead. As Stiles studied only excised breasts he was unable to reach the correct conception of the mode of spread of cancer. The author, by working on postmortem subjects, demonstrated the centrifugal spread of mammary cancer in the fascial lymphatic plexus and detected, by the microscope, its growing edge at points far removed from the breast. The only explanation that fits these facts is the now generally accepted theory of permeation rather than the embolic theory of dissemination.

The subclavian glands may be involved before the lower axillary glands, on account of the occasional presence of a lymphatic trunk which passes from the mammary region through the pectoralis major. Recurrence, presented as a deep mass below the clavicle, is sometimes apparently adherent to the bone. This type of recurrence is frequently seen by surgeons who do not dissect the axilla to its extreme apex. Operations are inadequate, in which only a portion of the breast has been removed for cancer, or the axillary dissection has not been made. The routine pathologic examination of every supposedly innocent tumor removed from the breast should never be omitted.

Operation was not refused in any case in which it was deemed possible to prolong the patient's life, or make the end of her life more comfortable. Forty-eight percent of the author's patients, who could be traced, were free of recurrence for three years. Recurrences in the scar and skin have been reduced to a low percentage. Isolated axillary recurrence, or recurrence in the region of the subclavian glands, has not been seen. Intrathoracic and hepatic recurrence was found in some cases, but the majority of recurrences were located in the supraclavicular and intercostal regions. The infrequency of local recurrence justifies the principles of the operation. The recurrences take place beyond the range of operation, either in the anterior mediastinal or the supraclavicular glands, and, less often, in the viscera. These structures may have been invaded at the time of the original operation.

Six patients recovered, in whom the primary operation was extended to include exploration of the



anterior mediastinum. In two cases the glands were found to be involved. One of these had widespread internal recurrence in six months, but the other was free from recurrence more than a year after operation.

Recurrence in the posterior triangle is seen just above the clavicle and below the posterior belly of the omohyoid muscle. In the earlier stages of recurrence in this region, the treatment is operative, but the operation must be thorough and systematic. If the cells have infiltrated the gland capsule and passed into the surrounding tissues, operative treatment is futile. Radium is useful preoperatively in these cases, as it reduces the risk of implantation of cancer cells on the raw surfaces.

Surgery has been supplemented for many years by postoperative x-ray radiation. It is now known that cancer cells can be killed by adequate radiation, and it is thus hoped that any remaining groups of cancer cells will be destroyed.

MERLE R. HOON.

**THE DIFFERENTIATION OF SAPHENOUS VARIX FROM FEMORAL HERNIA:** DeWitt Stetton (Surg. Gyn. and Ob., Vol. 32, No. 3) points out these aneurysmal dilatations of the upper part of the saphenous vein are regularly diagnosed and operated upon as femoral herniae even by very careful observers.

Points of differentiation:

- (1). The bluish appearance is absent if the subcutaneous fat is at all pronounced.
- (2). The compressibility is often just as marked in a hernia.
- (3). The enlargement with the increase in venous pressure as in coughing, or the disappearance on lying down, are not very unlike the hernial impulse on straining, on the one hand, and the spontaneous reduction of the rupture in the recumbent position, on the other. The author states that he has seen a number of these cases in which either the error in diagnosis was deliberately made or where the diagnosis was doubtful until the lesion was exposed at operation.

In addition to the above points in differentiation which are brought out by DeQuervain the writer adds the following:

- (1). The position of the swelling in the dilatation of the upper part of the saphenous vein is usually somewhat lower down than in the case of femoral hernia.
- (2). As a rule other varicose veins will be found on the leg and thigh if a dilatation exists near the saphenous opening.
- (3). Reduction of the tumor and pressure over the femoral ring by the examining finger does not hold back a saphenous varix which appears if the patient strains or stands.
- (4). The impulse on coughing differs materially in both conditions. Instead of the frank impulse as in a hernia, there is, in the venous dilatation a fluid wave or thrill.

E. M. JONES.

## GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

ARCHIBALD L. McDONALD,  
FIDELITY BLDG., DULUTH.

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**TREATMENT OF ACUTE GONORRHOEA IN FEMALES:** Block (Am. Jour. Med. Sc., Vol. 159, No. 4, P. 572). The author calls attention to the unsystematic treatment which these cases receive, and to the false impression that the disease is incurable. A routine is outlined which has given satisfactory results and is worthy of review.

In the early stage for the acute urethritic, rest is advised as much as can be obtained, large amounts of fluids often with saline diuretics, and a sedative mixture as the following; Tr. Hyocyanus, m v. Sodium bromide gr x. Liquor potassi Citratis zi. to the dose. Later local applications of silver nitrate are made to the urethra after careful drying with cotton applicators.

These are repeated every two or three days at first, then at longer intervals and continued till there have been three negative smears. The endocervicitis is more persistent. Douches of Potassium permanganate 1 to 8000, four or five times daily, are used for the first two weeks till the discharge lessens. Then local treatments following a definite routine: Careful exposure of the cervix through a bivalve is sprayed with an alkaline antiseptic solution, carefully cleansed and dried, then silver nitrate application followed by tincture of iodine. Two or three treatments a week are given for three weeks, then discontinue douches, and give fewer treatments, until three negative smears have been obtained. One of these should be taken immediately after a menstrual period.

ARCHIBALD L. McDONALD.

**VARICOSE VEINS OF THE FEMALE PELVIS:** Emge (Surg. Gyn. & Ob., Vol. 32, No. 2). After describing the anatomy of the pelvic veins, and comparing the structure and supports of the various groups, the author brings out the predisposing factors to this condition in the ovarian veins of the left side. Though other veins may be involved in late cases, the ovarians are the first and most extensively varicose in most instances. Retroversion of the uterus with or without prolapse interferes with efficient venous drainage. Acquired primary varicose veins follow pelvic congestion which may have been due to pregnancy, ptosis, habitual constipation, or menstrual irregularities.

A vicious circle is established resulting in weakening of ligaments, displacement of uterus, and further congestion. Secondary effects include; small cystic ovaries, fibrous infiltration in the ovaries, thickening, congestion, or hypertrophy of endometrium, fibrosis of myometrium, and sterility. Symptoms, include: Pain low in abdomen more often to

the left, relieved when patient is off her feet, low backache, and dysmenorrhoea. Secondly; gastric disturbances, or nervous indigestion. Local examination shows; marked tenderness in the cul-de-sac and a doughy mass, suggestive ectopic pregnancy. The mass and thickening are best felt with the patient in standing posture.

Treatment: 1. Non-operative, includes correction of malposition by suitable pessary, copious douches, and rest.

Operative: excision of veins and correction of retroversion and prolapse.

ARCHIBALD L. McDONALD.

#### DOUBLE FLAP LOW CESAREAN SECTION:

T. S. Welton (Am. Jour. of Ob. & Gyn., Vol 1, No. 4). The author reports 11 cases, 7 of which were potentially infected previous to operation, with no maternal mortality, and only six who showed any evidence of sepsis. 1 had been in labor more than 48 hours, 4 more than 24 hours, 3 more than 10 hours, and the rest were not in labor. Membranes had been ruptured in 7 for more than 10 hours, and all but one had been examined vaginally.

The essential points in technique were: low abdominal incision, transverse incision of peritoneum, stripping flaps from lower uterine segment, longitudinal incision in uterus, delivery of child and placenta, careful closure of uterine wound, then overlapping of peritoneal flaps to seal over uterine wound.

He concludes: 1. That the double flap and low caesarean section offers great protection against extension of infection to the peritoneum from the infected uterus.

2. For this reason the operation should be of service in all potentially infected cases.

3. For the same reason the field for caesarean section should be extended to cases long in labor, with ruptured membranes, and possible contamination, in preference to craniotomy.

4. The double flaps so completely peritonealize the uterus that adhesions and post-operative disturbances are rare.

5. Because of the results, obtained, and reasons given, this type of caesarean section should be preferred in elective cases.

ARCHIBALD L. McDONALD.



## ROENTGENOLOGY

### SUPERVISORS:

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### X-RAY FINDINGS IN CHRONIC GAS CASES:

Henry C. Pillsbury (Am. Jour. Roentg. Vol. 8, No. 4, p. 193, April 1921). The gases that leave behind them a chronic change in the lungs are chlorine, chloropicrine, and especially phosgene. Mustard gas is practically without effect on the lungs. The pathology in the lungs caused by these gases is similar, but presents certain points of difference.

Chlorine, the most irritant, affects the lining epithelium of the parts with which it first comes in contact—the trachea and larger bronchi. Chloropicrin, which must be broken up into a residue and HCL, only becomes effective after it has reached a part of the lung where moisture can be found—the medium sized and smaller bronchi. Here it causes the same lesions as chlorine. Phosgene is a little more stable than chloropicrin, and is only broken up into HCL and its residue in the smaller bronchioles and alveoli. A massive dose or prolonged exposure of phosgene or chloropicrin will affect the larger bronchi as well as the finer ones.

In chloropicrin cases, when the bronchiolar wall has been seriously damaged, an active proliferation of fibroblasts occurs, and the bronchial cavity becomes filled with granulation tissue; the final result is an obliterative bronchiolitis, with its consequent atelectasis or localized emphysema.

In phosgene cases, the lining epithelium is destroyed; later the epithelium regenerates, but there is a growth of granulation tissue in the walls of the finer bronchi which causes a thickening of the walls of the bronchi, and the peri-bronchitis. Occasionally the bronchus is entirely occluded and the end result is localized atelectasis and restricted areas of emphysema.

This condition is differentiated from early cases of pneumoconiosis in two particulars: the hilus shadow may not be enlarged, and there are no small areas of increased density to give the characteristic mottled appearance of dust inhalation.

The distribution, the uniformity, and the absence of areas of consolidation, suffice to establish the diagnosis from pulmonary tuberculosis.

R. G. ALLISON.

### LEATHER BOTTLE STOMACH (LINITIS PLAS-

TICA): Leon T. Lewald (Am. Jr. Roentg. Vol. 8, No. 4, p. 163 April 1921.). From roentgenologic observation of these cases, it appears that the peculiar type of stomach to which the term "leather-bottle" has been applied may represent any one of three conditions; first, fibromatosis; second, syphilis; third, diffuse carcinoma. Despite the dif-



difficulty of attempting to differentiate by roentgen methods alone, it is, nevertheless, possible to distinguish these cases one from the other in a large enough proportion of cases at least to facilitate and augment clinical diagnosis; and in many instances it is possible to make an absolutely correct diagnosis when taken in conjunction with the Wassermann test.

The author presents in detail five cases, three of carcinoma, and one each of syphilis and fibromatosis of the stomach wall. The characteristics of a leather-bottle stomach are a diffuse or more or less circumscribed constriction of the stomach-wall a gaping pylorus associated with rapid emptying of the stomach and dilatation of the duodenum, and there is frequently also a moderate dilatation of the oesophagus.

LeWald states that the terms "linitis plastica" and "leather-bottle stomach" may well be retained as descriptive of this type of deformity of the stomach, but with a full appreciation of its triple nature.

R. G. ALLISON.

#### REPORT OF THE CASE OF OSTEOPATHIA CONDENSES DISSEMINATA:

Heinrich Wachtel. (Fort auf d. Geb. d. Roentgenstr. Band 27, Heft 6. Feb. 24, 1921. Page 624.) This structural anomaly was first described by Albers-Schonberg in 1915. He described a case with numerous small condensation areas in the spongiosa and compacta of almost all the bones. The patella, vertebrae, skull, scapula, clavicle, as well as the diaphyses of the long bones were uninvolved. Two more cases have been reported, by Ledoux-Lebard, Chabaneix and Desanne in 1916, and more recently by Larrent-Moteau. The authors case was that of a twenty-three year old laborer. The roentgen examination was undertaken because of suspected arthritis of the sacro iliac joint. There was incidentally discovered this further condition which coincided exactly with the cases previously described, with the exception that the patella was also involved.

The etiology of this condition is not clear. Wachtel calls attention to the fact that in all four cases the condensation areas in the epiphyses occupied of the bones is apt to establish itself. This is supposed to develop as bacterial emboli of small and arteries. In the cases described this distribution in the skeleton of these areas seems to coincide with the point of embolus formation in the end arteries.

This conception affords a logical explanation for this phenomena as well as for the isolated condensed areas in the spongiosa which are commonly seen. Considering the unproved etiologic of this condition Wachtel suggests as a name for it, Osteopathia Condensans Disseminata.

R. G. ALLISON.

A CONTRIBUTION TO KOHLER'S DISEASE OF THE OS NAVICULAR PEDIS IN CHILDREN: M. Behm, (Fort auf d. Geb. d. Roentgenstr. Band 27,

Heft 6. Feb. 24, 1921.) Since Kohler published his observations in 1908 there has been practically no progress in determining the etiology of this condition. Stumme, Grune and Schultze have considered it to be a compression fracture; Haenisch, Preiser and Meulengracht have considered it the result of a traumatic disturbance of nourishment of the bone; while Kohler, Behm, and Wohlaue have maintained that it represented a disturbance of development sui generis.

The author's case, which roentgenologically presented the typical findings of Kohler's disease, presented clinically findings suggestive of infection and for this reason operative interference was decided upon. The cartilaginous form of the navicular was found to be normal without any flattening. The bony center was not red but presented a yellow color. This was found to be a dry, crumbly mass which was not only slightly adherent to the cartilage. This mass was removed and the wound closed.

The microscopic sections failed to show any evidence of spongiosa structure. The marrow showed a normal structure, it was permeated by delicate strands of connective tissue between which were blood vessel lumina which contained no blood cells. Distributed thru out the marrow were many structureless particles of necrotic tissue, which in part stained weakly with eosin, and which probably represented necrotic spongiosa. Osteoclasts were nowhere to be seen. The border of cartilage and bony center showed no attempt at calcification.

Thus the findings are those of an anaemic necrosis in the ossification centers and epiphyses of this patient showed that altho the boy was exceptionally well developed for 6¾ years, he had a bony development of a 4 year old child.

Therstappen has undertaken to study on cats the effect of destroying the nourishing blood vessels of the navicular and lunate bones of the carpus. He found that an aseptic necrosis of the bone occurred which corresponded exactly with the findings in this case of Kohler's disease.

The author believes that in his case of Kohler's disease that there was delay in the endochondral ossification beyond the normal limits which formed to a certain extent Locus minoris resistentiae. Then as the result of a disturbance of nourishment-perhaps incited thru trauma-there occurred an aseptic necrosis of the bone in the ossification center of the navicular pedis. He suggests that in all cases of Kohler's disease there may be a delayed endochondral ossification.

R. G. ALLISON.



## PEDIATRICS

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**THE INFANT OF LOW BIRTH WEIGHT: ITS GROWTH AND DEVELOPMENT:** Herman Schwarz, & Jerome L. Kohn., *Jour. of Dis. of Child*, March 1921.) From 2 to 5 per cent. of all viable births result in children of low birth weight.

The mortality rate during the first month in this type of case is ten times that of the normal. The lower the birth weight, the greater the mortality. The mortality rate for the year in this type of case is four and one-half times the normal. In these children of low birth weight the mortality is twice as great in the premature as in the full term.

Twinning in the premature does not markedly affect the mortality rate.

In the full term, the single pregnancy has twice the chance for life as compared with the twin pregnancies.

The gain in weight during the first twelve months is at the same rate as that of the normal child so that the deficiency is not made up at the end of the first year. Twins do not act differently from those of single pregnancies.

The growth in length is not made up during the first twelve months. These children seem to attain the normal in length sooner than the normal of normal birth weight.

The general condition and mentality seems to be that of normal children through infancy and early childhood, although they have a greater tendency to anemia and rickets.

R. N. ANDREWS.

**A POLYNEURITIC SYNDROME RESEMBLING PELLAGRAACRODYNIA SEEN IN VERY YOUNG CHILDREN:** Albert H. Byfield, (*Amer. Jour. of Dis. of Child.*, Nov., 1920.) During the past five years there appeared in this clinic, seventeen patients, all under four years of age, who have manifested a group of signs and symptoms out of the ordinary. The resemblance of their malady to pellagra was striking, but many points spoke against such a diagnosis.

The disease picture was a complex one, the nervous system and the skin being most involved, while the respiratory tract and the digestive tract appeared to be less affected. On the part of the nervous system the changes were chiefly sensory or trophic in character.

The skin manifestations were most uniform, and were quite definite. A symmetrical involvement of the fingers and toes, recurring at intervals was one of the most striking characteristics. The hands and

the feet were cyanotic and cold, there appeared a non-confluent erythematous rash, most marked at the tips of the fingers and gradually diminishing until at the region of the wrist it had quite faded away. The feet were only slightly less involved than the hands. Never was there observed anything like the clear-cut line of demarcation as in pellagra. When the eruption appeared on the body it was usually accompanied with paresthesia. With the passing away of the body eruption, pigmented spots were sometimes left. The back of the neck was never seen to have any breaking out or scaling as in pellagra.

The pulling out and falling out of the hair which was present in a number of cases and resulting sometimes in actual baldness, limited usually to the crown of the head. The loosening and falling out of the teeth was likewise a surprising manifestation and with it there was no adherent tissue, blood or exudate on the lost teeth. The nails were rarely involved. An extreme and obstinate anorexia was a prominent part of the picture. Many of the patients suffered extreme thirst. Frequency of urination was an almost uniform symptom and was often accompanied with pain. The duration of the trouble varied from two to eight months. The Wasserman test was negative.

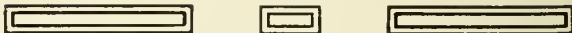
From these findings it seems probable that we are dealing with a primary disease of the nervous system. The local manifestations point to the involvement of the fifth nerve. The paresthesia suggests a sensory nerve involvement and the coldness and blueness of the finger tips and toe tips point to a vasomotor disturbance.

A corrective diet, complete in every respect, supplying an adequate number of calories, sometimes introduced by gavage, was given and insisted upon, as the importance of feeding was the only evidence of possible relationship between food and the disease.

The trouble started with a bad cold and we are forced to regard the respiratory infection as more than a mere coincidence. We are not at this time, however, justified in completely ruling out the question of the existence of a deficiency disease.

What then, is this interesting disease? Weston states that we are dealing with acrodynia or epidemic erythema. It has been suggested that we are dealing with a sequel of influenza so that the disease described is a post influenzal acrodynia or sensory polyneuritis.

**Treatment:** The marked emaciation which is the result of persistent aversion for food calls for vigorous treatment. Gavage should be resorted to if necessary. This is the mainstay of the therapy and often brings relief.





## BOOK REVIEWS

**PHYSICAL DIAGNOSIS**, W. D. Rose, M. D. C. V. Mosby Co. 2nd Edition. 1921. \$8.50.

The second edition of this work contains seven hundred and thirty-six pages with three hundred illustrations.

The standard methods of physical diagnosis are given in a clear concise manner.

It would seem that a re-arrangement of the contents might not be out of place. The section on "Head and Neck" comes last. Logically, it should come first.

EVERETT K. GEER.

**PRACTICAL TUBERCULOSIS**. Herbert F. Gammons, M. D. C. V. Mosby Company. \$2.00.

This is a small book on one hundred fifty-eight pages and is written for the general practitioner and those interested in tuberculosis.

For the physician it seems somewhat sketchy and for the layman too technical. No doubt, however, both would be improved by reading it.

EVERETT K. GEER

**A PHYSICAL INTERPRETATION OF SHOCK, EXHAUSTION, AND RESTORATION**. George W. Crile. Oxford Medical Publications. 1921.

The author presents this work to the profession as summaries of researches which he has conducted both in Cleveland and in France.

The theories proposed for the explanation of shock and exhaustion are discussed. The mechanism involved in shock exhaustion and restoration is considered and its relation to the principles formed is dealt with in detail.

The volume abounds in blood pressure tracings and photomicrographs.

After reading the book one is forced to agree with Dr. Crile that, "with such evidence of the practical value of bio-physical methods of attack upon clinical problems, it would seem that with medicine may approach a place among the exact physical sciences, and the physician may attack his problems from the more secure standpoint of the physicist."

EVERETT K. GEER.

**PRACTICAL PSYCHOLOGY AND PSYCHIATRY**, BY C. B. BURR, M. D. FIFTH EDITION, F. A. DAVIS COMPANY, PHILADELPHIA, PA. PRICE

When I was about fifteen years of age I visited a gypsy camp on the edge of town. A pretty little girl wanted to tell my fortune. I refused but she insisted, adding that for twenty-five cents she would show me something which I had always seen and something which I would never see. Being of a naturally curious turn of mind I at last gave her the quarter. She took my hand and pointed out to me that my middle finger was longer than my index finger, that she said I had always seen but my index finger was shorter than my middle finger and I would never see it longer than the middle one. Dr. Burr has succeeded in pointing out

many curious circumstances about our mind in an interesting manner in his chapters on psychology. He has used many homely and understandable similes to illustrate the subjects which the larger and more elaborate texts on the subject make very complicated and obtuse. Sometimes giving them interpretations of his own and arousing our interest much as the gypsy girl aroused mine. With such a comprehensible summary of psychology before us, he attacks psychiatry and again, by the use of illustrative cases succeeds in clarifying his subject matter. He has followed the classification of the National Committee of Mental Hygiene rather closely, but by many well-thought-out observations has made it exceedingly simple. His new chapter upon the prevention of insanity is unfortunately a little weak. There are undoubtedly many helpful hints in the case and upbringing of children in it. By their guidance in early years he points out how many of the bad habits of later years may be nipped. When, however, he deplores the present day games and past-preceding generation, he simply criticizes without taking into consideration the progress and changes in our present day mode of living.

Judging the book as whole production, it is, as the title implies practical, and I would add—interesting.

FRANK W. WHITMORE.

**TUBERCULOSIS OF CHILDREN**. Prof. Dr. Hans Much, University of Hamburg, Germany, English translation by Dr. Max Rothschild. The Macmillan Company. 1921. Price \$2.50.

This book is divided into a "general" and a "special" part. In the first section the author type of the human and bovine tubercle bacillus. He believes a transition from one type to the other is possible and therefore, of supreme importance. Adaption to their respective hosts the author believes to be responsible for their different characteristics.

The theory of Von Behring that "wherever tuberculosis is found, it has started in the first years of childhood, and that during this age most people pass through a tuberculous infection" is strongly upheld by the author.

The chapter on immunity is very instructive but contains nothing new.

In dealing with the development of tuberculosis Much states that our anti-tuberculosis campaign has been entirely wrong. He would treat the tuberculosis in children and claims that nothing has been done along that line so far.

As to the treatment of tuberculosis in children the author advocates the "non-specific" measures, sun, fresh air, hygiene, dietetic measures, X-ray, etc.; his "specific" treatment consists of injections of "partial antigens" or "partigens" so-called. There are three of these "partigens" which are non-soluble in water, albumen, fat-acidilipoid, and neutral fat. The water soluble "partigens" are harmful and are found in all tuberculin.

The second or special part of the book is de-

voted to the diagnosis and treatment of tuberculosis in children. The point is emphasized and rightly so, that even our so-called incipient pulmonary tuberculosis is really a far-advanced expression of the tuberculosis we acquired in childhood. The time to effectually cure the disease is in childhood.

The X-ray is the most important aid for diagnosis according to Much. D'Espines sign paravertebral dullness and the toxic symptoms are also of inestimable importance.

The use of "partigens" is the only new departure in the book. We have only the authors word that they are efficacious; no case reports nor other substantiating data.

The chapters on Infection, Immunity, Diagnosis etc., are quite in accordance with American ideas.

EVERETT K. GEER.

**ANAESTHETICS.** Dudley Wilmot Buxton. H. K. Lewis & Co., Ltd. (London). 1920. Sixth Edition. Price \$6.00.

The sixth edition of this work has been revised and some sections rewritten. Anaesthesia of all kinds, ether, chloroform, nitrous oxide, local anaesthesia, spinal anaesthesia, etc., are dealt with in detail. It is an exceedingly valuable book and should be carefully read by all who administer anaesthetics of any nature.

EVERETT K. GEER

**A GENERAL INTRODUCTION TO PSYCHANALYSIS BY PROF. SIGMUND FREUD, L. L. D. AUTHORIZED TRANSLATION WITH A PREFACE BY G. STANLEY HALL, PRESIDENT CLARK UNIVERSITY, BONI AND LIVERIGHT PUBLISHERS, NEW YORK. ....**

As the distinguished psychologist Stanley Hall says in his preface: "Few, especially in this Country, realize that while Freudian themes have rarely found a place on the programs of the American Psychological Association, they have attracted great and growing attention and found frequent elaboration by students of literature, history, biography, sociology, morals and aesthetics, anthropology, education and religion."

Freud divides his book into three parts compris-

ing twenty-eight lectures; he points out the great difficulties of psychoanalysis and frankly discourages disciples from taking it up. Somewhat bitterly he points out that a psychoanalyst is subjected to social and professional ostracism; it seems as though everything new must pass through a veritable test by fire before being accepted, and psychoanalysis is no exception. Lectures number two, three and four deal with that interesting by-product of psychoanalysis the psychology of errors, and show by examples and deduction that slips of the tongue, mislaying objects, forgetting names, etc., are valid psychic acts with intention in the background. Lectures five to fifteen inclusive take up dreams and maintain that dreams are wish fulfillments appearing in the form of symbolic manifest dreams, which, when analyzed, reveal the wish in the latent dream. Freud says that there is no other field in which one can so quickly be convinced of the correctness of the assertions by which psychoanalysis stands or falls, as by investigation of the dream problem.

The succeeding lectures deal with the neuroses, psychoanalysis and psychiatry, the meaning and development of symptoms, libido, transference, fear and anxiety, the unconscious, suppression, ordinary nervousness, and a final chapter on analytical therapy in which the author disclaims any desire to teach the technique of psychoanalysis in this book.

The whole work is a philosophical consideration of the psychology of various disorders, and a demonstration of the origin of these because of a conflict between sex urge and a personality built up by social environment resulting in suppression and vicarious gratification; the cure by psychoanalysis consists in discovering to the patient the origin and meaning of his malady; in other words, of rendering conscious that which was unconscious. The book is more than this, it is a defense of psychoanalysis which he calls an unfinished thing still in the process of development; he divides the mind into the conscious, the fore-conscious and the unconscious; certainly no single human being has ever contributed as much to psychology as has Freud and particularly by his masterly studies of the unconscious. HALDOR SNEVE, M. D.

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# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### SOME OBSERVATIONS ON THE CHRONIC FORM OF LETHARGIC ENCEPHALITIS.\*

C. EUGENE RIGGS, M. D.

*St. Paul, Minn.*

In a recent note<sup>1</sup> on lethargic encephalitis, I reported two cases as illustrative of the chronic form of the disease, one of them manifesting the Parkinson syndrome. So little was definitely known about the infection that I used the term "chronic" with much hesitation. From 20 to 40% of the patients suffering from Epidemic Encephalitis die during the acute attack. Two of my patients recovered after a year's illness. Grossman<sup>2</sup> states a majority make a functional recovery after an illness varying from six to twenty-four months. All of us have observed a progressive disease of the nervous system follow this infection. The study of the cases in this report has materially clarified my views and justifies my assertion that in addition to the acute form there also occurs a sub-acute or chronic infection.

Encephalitis lethargica is not the modern disease that many observers would have us think. Crookshank<sup>3</sup> states that "during 450 years at least, outbreaks in many clinical and epidemiological forms have invariably appeared in definite relation to epidemics of influenza"; the commonly recognized form being that of the acute attack lasting from ten days to several months. The symptomatology of encephalitis is protean, greatly exceeding that of lues, the differentiation being at times a matter of great difficulty and can only be determined by the serologic findings. The infecting virus has a predilection for the brain cortex and the brain stem; no part of the nervous system, however, is immune. Spinal

forms of the disease have masqueraded under the guise of atypical manifestations of poliomyelitis, both conditions occurring sporadically. Localization of the infection may be isolated or disseminated. The point of attack may be the meninges, the ventral or dorsal roots, the dorsal root ganglion or the cord itself.<sup>4</sup> Some outstanding symptom dominates the clinical picture and indicates the nervous structures affected. In 121 of the 864 cases collected by Weschler, there were definite predominating symptoms; in other words, in only 14% of the cases could an attempt at classification be made. The futility of a permanent classification on a purely symptomatic basis is clearly apparent.

The report of these five cases of encephalitis is interesting because of their chronicity and their protean and perplexing syndrome. The term "chronic" possesses a double meaning—that of duration and in addition that of "an active change or process." It is the existence of the latter that makes the recognition of these cases so important and affords therapy at least a chance to avert ultimate nervous disaster. Buzzard has shown that in epidemic encephalitis, atheromatous changes take place in the blood vessels of the central nervous system. Abrahamson<sup>5</sup> thinks that the occurrence of these atheromatous changes and the chemical aberrations due to the involvement of the endocrine glands suggest the probability of a chronic and toxic type of the disease.

The syndrome of this chronic infection is as varied as are the physiologic and psychologic activities of the central nervous system. The most usual symptoms are headache, vomiting, diplopia or blurring of vision, insomnia, restlessness, morbid apprehensions, fatigability, radicular pain, stiffness of the neck muscles, Kernig's sign, motor aphasia, hemiparesis, generalized tremor, tremor of the tongue and facial muscles, the Parkinson face, attacks of mental confusion, sweating, depression, hal-

\*Read before The Ramsey County Medical Society, May 23rd, 1921.

lucinations of sight, causeless laughing and crying, menstrual irregularities, low blood pressure, tachycardia, slow or rapid pulse, etc.

*Case I.* Miss A. Referred by Dr. Archibald MacLaren, Jan. 13, 1921. Age 28 years; father died of appendicitis in 52nd year; Mother is in 69th year and well; five brothers and two sisters all living and well; usual childhood infections; small-pox in 12th year. Tonsillectomy four years ago. Previously to this, there had been attacks of neuralgia, the pain being generally over the left eye; these attacks ceased after the removal of the tonsils. A year ago last fall, she had ptomaine poisoning; she was in good health until an attack of influenza last March. There was high fever, headache, marked drowsiness, etc. After the influenzal attack, there developed diplopia and the patient was very tired and drowsy; in this condition she returned to her teaching; shortly afterwards she complained of cold sensation over the vertex and pain which was located over the left eye and diffused itself over the forehead; there was also pain over the nape of the neck and back of the head; there was vomiting and vertigo; she was subject to sensations of heat followed by cold and a profuse perspiration all over the body. There had been sharp, irregular pain in the arms and legs also hallucinations of sight ever since the illness began, which had practically ceased. She had spells of being disoriented as to place and time. She had to give up her work frequently and go home; as soon as she was a little better, she would resume her teaching. In June 1920 she greatly improved; the symptoms practically disappeared with exception of the diplopia, which was much less marked. There was still present a cold perspiration and occasional mild headaches; she felt weak and exhausted. Since the first she has noticed her mind was not as alert nor her memory as good as formerly.

The latter part of October the symptoms returned; the headache greatly increased in severity and became unbearable; she became weak and was unable to sleep; the diplopia, however, disappeared. It was at this time she consulted me. The movement of the neck muscles was very painful and there was a Kernig in both legs. All fall, there were daily spells of vomiting and marked depression; the headache was so severe that she had to be kept under anodynes; the sinuses were negative; the suffering was so intense, she said if opportunity had offered, she would have taken her life. There was Kernig in both legs. Blood pressure 130 systolic, 80 diastolic; hemoglobin 82 per cent; red blood cells 4,360,000; white blood cells 11,800; urine showed a trace of albumin. The pressure of the spinal fluid was normal; no globulin; four cells per c. mm. and goldsol reaction 00011000-00. On March 1st, she developed trouble with the middle ear. She left the hospital April 15th apparently well.

*Case II.* Miss J. Referred by Dr. J. S. Gilfillan, Feb. 24, 1921. Age 25; teacher; parents living and well; usual childhood infections; strong and vigor-

ous until school year 1918-1919 during which time she taught subnormal children. As a result of this she became very nervous. In October 1919, she had an attack of influenza; she was in bed a week, after which she resumed her teaching, but she was very weak, complained of being exhausted and was compelled to give up her work. At this time she had severe headache and a persistent insomnia: she said she felt as if she could not drag herself around; there was diplopia and marked inco-ordination of both upper and lower extremities; she was lethargic and would drop to sleep the moment she sat down; this lethargy continued for more than three months; there was also a generalized tremor all over the body; the flesh was sore to pressure and the skin hyperesthetic; there was in addition at this time a constant aching of the upper and lower extremities, especially the latter. The symptoms persisted until the spring of 1920 when she again went back to her teaching, shortly after which she began to improve and during the summer felt quite well. In the fall she had an attack of bronchial pneumonia with a recurrence of the former symptoms. The headache was very severe and there was a great deal of pain in the neck and down the spinal column; at this time she developed attacks of momentary mental confusion when she was unable to comprehend what was said to her. She could not see distinctly and there was a motor aphasia. In addition to these symptoms she was exceedingly nervous and very hysterical, being subject to crying spells and becoming terrified because of a sense of impending trouble as to the character of which she had no conception; she was very much depressed. The physical examination was negative aside from the existence of an ovarian cyst which had been developing for the past two years. The neurological examination was negative aside from a double Kernig. Hemoglobin 86 per cent; red blood cells 5,850,000; white blood cells 8,600; blood pressure 112 systolic, 76 diastolic; urine negative. The spinal fluid indicated pressure; there was no globulin; two cells per c. mm. The goldsol reaction was negative; Wassermann negative. During her stay at the hospital the pulse ranged from 80 to 106; the temperature ranged from subnormal to 99.4. She left the hospital April 20th, somewhat nervous because of the approaching ovariectomy—otherwise apparently normal.

*Case III.* Miss C. Age 20. Referred by Dr. A. H. Aanes, Red Wing, Minn., Jan. 17, 1921. Family history negative. Appendectomy at 13; four months ago exodontia of two abscessed teeth. Since 14 years of age she had not been very strong. She had influenza twice in 1918 and apparently recovered but has not been as well as formerly. Ten months ago she developed an acute otitis media of the right ear. The right hand and arm became painful, numb and weak and she has since been unable to use either. During the last week her right leg became affected; it is painful, numb and paretic; there is a persistent headache and insomnia; for months she has suffered from diplopia; both knee-jerks plus, the right spastic;



Achilles normal. A left hemianesthesia is present; the background of the eyes, normal; pupils respond to light and accommodation normally. Blood pressure 118 systolic; 56 diastolic; hemoglobin 78 per cent; urine negative. This patient, Dr. Aanes writes me (May 5th) has had a rather stormy experience. After her return home, he made a spinal drainage at my suggestion. The next day she developed La Grippe which she attributed to the lumbar puncture and would have no more of them. Later she developed bronchitis and mumps. A month ago she again sought medical advice. A diagnosis of hysteria was made in spite of her history of two previous attacks of influenza, a subsequent hemiparesis of right arm and leg, associated with pain and numbness, a persistent headache, a diplopia of months' duration and a spastic right knee-jerk. Her present condition, the doctor states, is about the same as when I examined her.

*Case IV.* W. Lawyer; age 36; parents living and well; one sister died of intestinal tuberculosis; one of influenza; usual childhood infections; typhoid in 14th year; tonsillectomy a year ago; no venereal infection; an athlete, knocked unconscious while playing foot-ball, but no after effects. An old right facial paralysis. One child; wife has had no miscarriages. He was perfectly well until exposure to a blizzard a year ago. He was delirious, nauseated, and says he was foolish but does not remember much about this illness, he says there was difficulty of speech and that he could not find the word he wanted to express himself, that he was exhausted, apathetic and spent most of his time lying around. Ever since this illness, he has been slow in his movements, somewhat sluggish mentally. He is depressed, always tired, lacking in endurance, and laughs in a silly manner if excited. There is a marked tremor in the facial muscles and lips and tongue; no noticeable dysarthria, no sensory disturbances, no Rhombergism; deep and superficial reflexes normal; pupils react to light and accommodation normally; red blood cells 4,360,000; white blood cells 9,800; hemoglobin 90 per cent; blood pressure 124 systolic, 68 diastolic; urine normal; blood Wassermann negative; spinal fluid gave a negative Wassermann, Nonne 1 plus, 9 cells per c. mm., goldsol reaction 0001110000. Because of the diagnosis of paresis in this case we gave a provocative injection of Neosalvarsan and the serologic examination made in two laboratories gave the following findings: Nonne 1 plus, 3 to 9 cells per c. mm., blood Wassermann negative, spinal fluid Wassermann negative, colloidal gold curve 0001110000.

*Case V.* Mr. H., 55 years of age; referred by Dr. Archibald MacLaren, Jan. 14th, 1921. Apr. 28, 1920, he was apparently in the best of health; a few minutes after twelve o'clock he began to suffer from headache which became more and more severe and lasted three days. At this time he said that he had sensations of cold all over the body, was perfectly conscious but was so distressed that he felt he was dying. His heart was very irregular; he was given

a hypodermic of morphia and slept for nearly nine hours; he was lethargic for two days. His wife tells me that she could easily waken him and he would answer correctly but immediately fall asleep. After this he was delirious for three weeks. There was no fever throughout the sickness. Five weeks after he was taken sick he developed diplopia which lasted until the second week in October. His wife states that a week after he was taken ill he did not use the left arm as freely as the right; this lasted for three days. The right was in constant motion. Left lateral homonymous hemianopsia; fundus normal; central vision approximately normal. During this sickness there was a marked albuminous urine. At present, in addition to having little endurance, he is exceedingly nervous and slight things annoy him beyond what they should. He worries constantly because of the hemianopsia. The neurological examination is absolutely negative; blood pressure 166 systolic, 96 diastolic; urine normal. Blood Wassermann negative. No blood count made.

In H. approximate recovery has taken place; the distressing nervousness will probably disappear; the left lateral homonymous hemianopsia will be permanent; he is able to read about normally with glasses. There are two further points of interest, i. e., the absence of fever and the suddenness of the attack. The fulminating form of which the latter symptom is an instance may occur with the suddenness of an apoplexy. Bramwell has observed three cases of what he calls the apoplectiform type.

*Case VI.* C. is an excellent illustration of the mild form of acute lethargic encephalitis and is reported to stress the value of the Barany test in determining a focal infection point.

C. Age 28; referred by Dr. C. L. Larsen, Jan. 27, 1921. Parents living and well; mother somewhat nervous. Empyema 15 years ago; otherwise never ill nor injured; denies venereal disease. Two weeks ago contracted a cold; had a sore throat and ran a temperature for one day that he knows of; had a dull headache part of the time and the left side of the face was sore; four days ago he began to have diplopia; for past several days there has been lethargia, headache and attacks of vertigo; no vomiting; slight Kernig; memory good; is active mentally. Hemoglobin 90 per cent; blood pressure 130 systolic, 60 diastolic; urine normal. Serological findings normal. The Barany test showed a spontaneous lateral nystagmus on looking to the right and to the left, also a rotatory and vertical nystagmus on looking up. Both the turning and caloric tests show an absence of past-pointing or vertigo from both the horizontal and vertical canals of the left ear (Larsen). This would indicate a lesion somewhere in the left superior cerebellar peduncle.

Concerning the subacute and chronic forms of this infection but little is known. Of the nature, character and scope of the pathological forces, "the sheltered and emasculated organ-

isms," the perverted chemical changes due to endocrine implication and the ability of nature to come back under adverse conditions, we can as yet only conjecture. Ely<sup>6</sup> has reported four cases, two occurring in 1919, two in 1920, none completely recovered. The patient most improved still experiences occasional attacks of diplopia. One of my patients made an approximate, two, an apparent recovery. In Miss C., in whom later a diagnosis of hysteria was made, the symptoms remain essentially unchanged. The case of W. is instructive because of two things: the possibility of mistaking encephalitis for paresis and the unreliability ever present in serological examinations.

There is a certain type of cases such as the Parkinson syndrome, the chronic choreas and the progressive inflammations of the cord in which the prognosis is most unfavorable. Courtney has seen the Parkinson syndrome disappear, as well as change into a general clonic myospasm which lessened in severity but did not cease. There are certain cardinal symptoms that should be emphasized; the slight increase in leucocytes present has little significance; it is absent in the lethargic<sup>7</sup> and present in the myoclonic type of encephalitis. Insomnia is a dominant symptom as is lethargy; the former is a characteristic finding following encephalitis in children.<sup>8</sup> Two of my cases showed a definite remission and this has also been observed during the acute attack. Miss A. was greatly distressed by hallucinations of sight, a symptom also common to the acute stage in which most of the hallucinations are visual.<sup>9</sup> Depression is generally present; in two of my patients this was associated with suicidal tendencies. Diplopia and blurring of the vision is as common in the chronic as in the acute forms of encephalitis and it requires skillful questioning to elicit it. It is due<sup>10</sup> to an infiltration in the region of the substantia nigra with lymphocyte-like cells implicating the fibers of the third nerve as they pass out. The Kernig sign is seldom absent; it is most persistent and possesses a prognostic value. All the patients that I have examined have complained of a feeling of distressing weakness and referred to this more frequently than to any other symptom. The spinal fluid changes, if any, are usually very slight and are essentially the same in the acute

and chronic forms. Increase in pressure may or may not be present; the same is true of globulin; the cell count ranged from two to nine lymphocytes per eu. mm., the goldsol reaction varies from 0 to the paretic curve.<sup>11</sup> The usual reaction is that of syphilis. Barker<sup>12</sup> reports a "combined paretic and meningitic curve," also an atypical paretic curve. Thompson has observed atypical paretic curve. This is as it should be for the paretic curve simply indicates parenchymatous involvement. The prognosis with our present knowledge carries but little certainty but we hope Grossman's optimism will be confirmed by future observations. Physiological rest in so grave a disease as inflammation of the brain is a matter of imperative moment. After a week of this enforced rest, the distressing restlessness observed in certain cases usually disappears. Should there be increased pressure of the spinal fluid, or a definite goldsol reaction, spinal drainage should be made; indeed, in absence of the above conditions it is often followed by notable benefit. The injections of the nueleinates, lumbar puncture with the subcutaneous injection of the patient's spinal fluid<sup>13</sup> (Reggett), and the intraspinal injection of the patient's blood serum (Brill) found beneficial in the acute attack, are well worthy of trial. The use of mixed or individual glands according to the indications is to be advised. When there is great restlessness, bromide is indicated. Pain should be relieved by aspirin and phenacetin. Careful alimentation is of vital importance and galvanism and massage in certain cases have a definite place.

Note: In an article on the serology of the spinal fluid and blood in epidemic encephalitis by Kraus and Pardee appearing since this paper was written, they arrive at the following conclusion—that there is an increase in the spinal fluid sugar; that there is a lack of correspondence between the amount of spinal sugar which is invariably increased and that of the blood which is never increased; that the increase of cells, globulin and sugar, with changes in the colloidal gold curve is a tetrad of laboratory findings possessing a diagnostic value.

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## BILATERAL CYSTOCLE OR CYSTIC DILATATION OF THE LOWER END OF THE URETERS: A SUCCESSFUL METHOD OF TREATMENT\*

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Civiale mentioned cystic dilatation of the ureter in 1843. In 1856 Lilienfeld reported the first pathological specimen. The first diagnosis of this condition was made by L. Wolf in 1899.

Dr. M. Lavandera, in a recent paper, collected sixty-four cases of ureterocele. Forty-seven of these occurred in the living and seventeen were post mortem specimens. In this series thirty-two of the sixty-four cases reported had other urinary malformations.

*Embryology:* The first bud of the renal system which eventually becomes the kidney and ureter begins early in the second month of fetal life as an outgrowth from the dorsal side of the Wolffian duct just before it terminates in the cloaca. This outgrowth which is called the renal bud, the stalk of which represents the ureter, develops in a general upward direction and eventually forms the renal pelvis.

In time, the cloaca differentiates and becomes smaller. The openings of the ureters and the Wolffian ducts about this time are to be found in the embryo bladder, which is derived from the cloaca and the allantois.

Later the ureters and Wolffian ducts separate from above downward so that they acquire separate openings. The space between the openings at first becomes larger and develops into the prostatic urethra. Eventually, the Wolffian duct, which becomes the vas deferens in the male, empties into the prostatic urethra as the ejaculatory duct, while the ureter terminates in the trigone of the bladder.

It may be assumed that the deformity, of which we are writing, is caused by a failure in the development of a sufficient lumen in the renal bud near its lower end as it joins the bladder. It is also possible that the mucosa of the bladder develops an insufficient opening for the outflow of urine.

*Etiology:* In our opinion cystocle or cystic dilatation of the lower end of the ureter is congenital in origin, although an acquired type is possible. The latter may be the result of the impaction of a small stone in the ureter just beneath the mucosa of the bladder.

A post mortem specimen reported by Smith, in which he found bilateral ballooning of the lower end of both ureters, indicates that obstruction due to stone cannot in itself be assigned as a cause of this condition. In this pathologic specimen, which Dr. Smith reports in detail, a stone was impacted in the lower end of the right ureter, while on the left side, in which the congenital dilatation was the greater, no stone was found. The ureteral

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opening on this side was so small that no stone could have been passed.

We are of the opinion that ureteral stone may be permanently arrested in the lower end of a cystic ureter because of the tiny opening. However, the stone is the result and not the cause of this deformity.

*Symptoms:* In the absence of infection, the majority of patients with this condition have not had symptoms which indicate obstruction to the outflow of urine. When infection takes place, however, symptoms usually develop rapidly and in many instances the patient has a very severe time. Prolonged pain of an aching character, but not severe, usually beginning in the flank and referred to the bladder area, is frequently observed. In many instance, however, the pain is severe, colicky in character and greatly resembles that found with ureteral stone. There is usually no gastrointestinal upset, although some vomiting may occur.

It is difficult to differentiate this condition from appendicitis, gall-bladder disease, or pelvic infections. The patient whom we report and many of those whom we have been able to find in the literature, have had some abdominal operations without relief.

Very recently, we observed a patient who had bilateral, pin-point ureteral openings situated on cone shaped tumors in the base of the bladder. The catheterized urines contained pus. The patient had a history of right lumbar pain, accompanied by temperature and gastrointestinal upset. She had complained for about one week of pain and temperature before her urine was examined. She had no symptoms referable to the bladder. The x-ray examination of both kidneys, both ureters and bladder was negative. A No. 4 ureteral catheter could not be passed with the ordinary direct vision cystoscope because the openings of the ureters pointed backward toward the roof of the bladder. An indirect instrument that would permit of catheterization at a right angle was used. With this instrument and after long, tedious manipulation, an ureteral catheter could be passed. Because of the tiny ureteral openings and the difficulty of catheterization, a right pyelogram was made to determine the presence or absence of hydronephrosis. The pyelographic shadow demonstrated a slight degree

of enlargement of one calyx, the ureteropelvic juncture being slightly wider than normal. This patient had not had a previous history of lumbar pain. The deformity found at the lower end of both ureters was a congenital condition and symptoms had not been produced until infection had taken place. We were able to find very badly diseased tonsils which were removed. Repeated dilatation of the ureters, together with lavage of the kidney pelves, relieved this patient of her pain and discomfort. The urine after two weeks treatment was free from pus and no growth could be obtained upon the ordinary culture media. This patient had other genito-urinary malformations.

*Cystoscopic Findings:* With the cystoscope, we have recognized two types of cystocoele. With the mild type, the outlet of the ureters is a prominence or cone shaped tumor on the floor of the bladder. The openings of the ureter may be on the apex of the cone or may be located on its side or the opening may point posteriorly. This condition may be unilateral or bilateral. The urine usually leaves the opening in a tiny jet and not with the force that is observed when the ureter is normal. It is difficult to introduce a catheter because of the tiny opening and in many instances, in our experience, an opiate or an anesthetic had to be used before a catheter could be passed.

A more severe type of this condition is one in which the ureter in its course through the bladder, is observed as a distinct ridge, varying in width from one-quarter to over one-half inch. The portion of the ureter that protrudes into the bladder is usually club shaped and is broader than that portion which passes through the bladder wall. This clubbed end will increase in size as the urine passes through the ureter and decrease as the urine flows into the bladder. When this tumor is filled with urine, it will transmit light, as does a hydrocele. The opening of the ureter may point forward, toward the roof of the bladder, toward the side, or posteriorly. When the openings are so situated, it is very difficult to introduce a catheter.

Kreisel and Gehl differentiate prolapse from ureterocoele. In their opinion, prolapse has a pedicle base and a broad top, the exit of the ureter being centrally located. With ureterocoele, they find a broad base, the ureteral



opening usually located eccentrically. With prolapse, it is possible to replace the mucosa into the ureter with the ureteral catheter, while with ureterocele, this cannot be done.

**Diagnosis:** A diagnosis can only be made by cystoscopy or by surgical exploration of the bladder. This condition may be overlooked unless pus is found in the urine or unless a routine cystoscopic examination is made.

**Treatment:** Many methods of treatment have been reported. Most writers find that excision is the best method. When the tumor is excised, the mucosa of the bladder is stitched to the mucosa of the ureter. Some observers have reported that recontraction has taken place after such operations—in fact, one writes that no method of treatment that he knows of will permanently cure this condition, as recontraction always takes place. In the few patients which we have observed, open operations have not been necessary.

Intravesical operations, such as slitting the ureter and dilating with catheters and bougies, have been tried. In one or two instances, the high frequency current has been used without success. Pollet, in a recent article published in the *Journal d'Urologie*, Paris, recommends electrocautery.

In the mild type of ureterocele, in which the ureteral outlet is situated on a small cone shaped prominence in the bladder, dilatation with ureteral catheters, together with thorough lavage of the pelvis, of the kidney and ureters, has been sufficient. We have always, however, endeavored to locate the original focus of infection which in most instances has been in the tonsils, in the teeth, in the sinuses, etc.

When the ureterocele is large and the patient complains of obstructive symptoms, we have been able to produce more than temporary relief by using the cold fulgurating wire. As will be described below, a very large ureteral opening can be made in this manner, which in our experience, does not contract. If contractions does take place, the ureter should be transplanted elsewhere in the bladder.

The following report illustrates the more severe type of this condition:

**Patient**—Male, age thirty years.

**Present Complaint**—Pain in both groins and flanks.

**Family History**—Negative.

**Past Illnesses**—At the age of ten or eleven years, this patient remembers having had a pain of a definite

character on both the right and left sides of his abdomen. At first this pain was not severe, but it gradually became so and he was operated upon five years ago for appendicitis. There was no relief from the right abdominal pain following the operations. In patient's opinion, the pain was brought on by heavy work or overwork. There is no venereal history and none of previous diseases or infections.

**Present History**—In October, 1920, patient was seized, while ploughing, with a very severe sickening pain in the right groin and testicle. This doubled him up, he perspired freely, became extremely nauseated and vomited. The patient described the pain as being steady, with radiation up and down the right side and into the testicle. The patient will not commit himself as to the pain in the right side beginning in the flank and radiating to testicle, or vice versa. This pain lasted three or four hours and was relieved by a hypodermic of morphine. He thinks he had some frequency of urination during the attack. However, no blood was present in the urine.

February 1st, 1921, patient had the same type of attack as recorded above. A hypodermic of morphine was given for the pain. No hematuria was present at this time, nor does patient remember urinary frequency. This second attack was on the left side.

**Physical Findings**—The patient is a well developed young male; weight 170. Wears glasses. The tonsils are large and ragged; however, no pus was demonstrated. The teeth revealed focal infection. Chest negative. Abdomen revealed nothing other than an old appendectomy scar. The extremities are negative. Complete gastro-intestinal examination negative. Patient was referred for x-ray examination which was negative for calculus in the urinary tract. The urine contained an occasional blood and pus cell.

The first cystoscopic examination was made February 3, 1921. The ureters appeared as ridges on both sides of the bladder and ended in larger club shaped tumors (see drawing). The tumors increased and then decreased in size as the urine passed through this portion of the ureter. On the right side the swelling was greater. During the first examination it was impossible to catheterize the ureters. The tumor on the right side transmitted light when filled with urine.

February 4, 1920, under caudal anesthesia, with an indirect instrument, I was able after manipulating for many minutes, to introduce a very small catheter into each ureter. A bilateral pyeloureterogram was

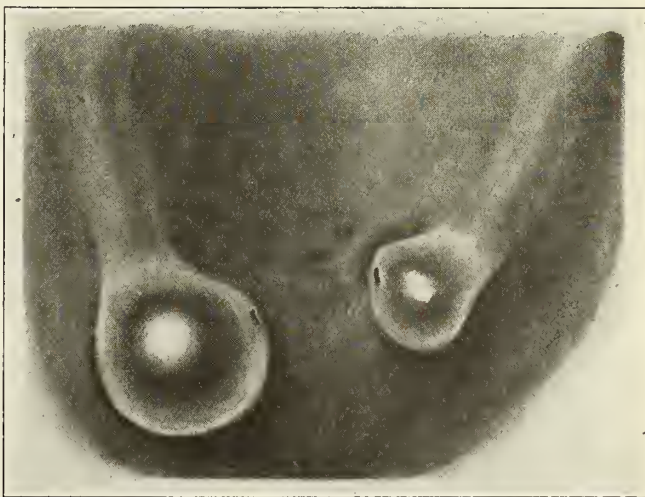


Fig. 1. Cystic dilatation of the lower end of both ureters as seen through the direct vision cystoscope.

made. On the right side, the ureter was distinctly enlarged with moderate dilatation of the pelvis; on the left side, the ureter was not completely filled so that the shadow was indistinct. There were occasional pus and blood cells in the catheterized specimen.

February 8, 1920, patient was again cystoscoped in the office. The cystic tumors were still present. With a cold wire cautery and the high frequency current, a hole was made in the cystic tumors. The wire was forced into the tumors parallel to the ureters so that a hole would not be made through the bladder wall.

Two hours after the cautery, the patient had very severe bilateral lumbar and low abdominal pain. It was necessary to give him large doses of morphine before he was at all comfortable. Because the pain continued, the patient was sent to the hospital for observation. While in the hospital, he developed a temperature of 104.4. The attacks of pain became less frequent but were just as severe as before. Eventually, the pain disappeared from the left side but remained in the right. After a week in the hospital, patient was free from temperature and pain. The amount of urine passed during the stay in the hospital was normal.



Fig. 2. The same condition two months after operation—the openings of the ureters are large and do not contract.

On the second of March, about one month after the cautery, he returned for examination. At this time both ureteral orifices were open, the openings being one-quarter of an inch across. Urine could be seen spurting from these openings as in a normal case except that the valve action was not observed. Patient returned again in one month. He reported that he had had no pain and was free from trouble with the exception of slight frequency of urination. The cystoscope was passed and both orifices were found to be normal except that they were open and did not close as does the normal orifice.

This patient has been entirely relieved of his trouble and is now in excellent health. Although sufficient time has not elapsed for a contracture to take place, we believe that this patient will remain entirely well. He will be examined two or three times each year. The tonsillar infection, together with the infected teeth, have been thoroughly treated.

In many of the reported cases, a recurrence of symptoms is frequent no matter what operation or treatment has been adopted.

After careful study of the few patients whom we have observed and those reported in

the literature, we suggest the following:

1. Ureterocele or cystic dilatation of the lower ureter is congenital in origin.
2. Symptoms from this deformity may not appear unless urinary infection occurs.
3. The mild type can be relieved by dilatation of the ureter. The severe type requires some operation which opens the ureteral outlet permanently. In our opinion, fulguration, if properly done, will make a permanent opening.
4. To effect a cure with this condition, urinary infection must be eradicated. This includes the search for and thorough relief from all focal infections.

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#### COMPLICATIONS OF PROSTATECTOMY\*

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In the Mayo Clinic complications of prostatectomy occur almost exclusively in the treatment of benign hypertrophy since, if a clinical diagnosis of carcinoma of the prostate is made, the disease is usually treated by other than surgical means. The complications are not confined to those due to removal of the prostate, but include the renal disturbances produced by enlargement of the gland, and the operative and postoperative complications.

Adenomatous hypertrophy of the prostate causes a much larger percentage of cases of obstruction at the neck of the bladder than chronic diffuse prostatitis, usually with adenomatous hypertrophy. However, the type of gland or its degree of enlargement bears no definite relation to the amount of disturbance it may produce. A moderately enlarged gland may produce more mechanical interference with emptying of the bladder than a huge

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intravesical prostate, and usually not until this mechanical interference occurs do vesical symptoms appear. The subsequent renal insufficiency and retention of urea bear direct relation to the amount of residual urine and infection. The uremia is actual or potential, depending on the amount of residual urine and consequent infection. Its recognition and treatment before operation have been entirely responsible for the infrequency of postoperative uremia at present, contrasted with its frequency in past years when the patient was subjected to prostatectomy without preparation. The means and indications for the preliminary treatment in these cases have been published recently.<sup>1</sup> If the residual urine exceeds 2 ounces the patient is subjected to preliminary drainage of the bladder by urethral or suprapubic catheter until his general condition, renal function, and urea elimination approximate the normal.

The operative and postoperative complications of prostatectomy have been materially minimized with the increased popularity of the suprapubic open operation. Vesical diverticula and stones are so often associated with benign hypertrophy that their recognition and treatment simultaneously or subsequently are important in order to bring about normal function of the bladder. The frequency of these associated lesions should discourage the blind enucleation of the prostate through a small suprapubic incision, which admits only the finger, or through a dilated suprapubic sinus of a primary drainage operation. Exposure is as important in surgery of the prostate as in other fields of surgery. It is true that in an effort to perform an open operation, particularly by the two-stage method, prostatectomy preceded by preliminary suprapubic drainage, the peritoneal cavity occasionally is opened accidentally. The reflexion of the peritoneum from the anterior abdominal wall on to the bladder is quite variable; at times it is high on the fundus and occasionally low toward the pubis near the bladder neck. This occasional low reflexion of the peritoneum presents dangers in preliminary stab suprapubic drainage and blind enucleation of the prostate which are not obviated entirely by distending the bladder with fluid or air. We have observed extreme distention of the bladder in cases with acute and chronic retention in which the fundus of the bladder at the level of the umbilicus failed to carry the peritoneal reflexion sufficiently above the pubis to avoid transperitoneal entrance to the bladder. By incising down to the bladder the peritoneum can be stripped back and the trocar introduced extraperitoneally when a simple drainage is desired. When the distended bladder returns to its normal size after drain-

age the peritoneal fold often drops down around the suprapubic sinus, which increases the liability of its being opened at the time of the second-stage operation or of removal of the prostate by excision of the sinus and open exposure of the bladder, but we have not observed peritonitis or any ill effects when the peritoneum has been closed immediately. The danger lies in failing to recognize that the peritoneum has been opened, and in allowing postoperatively urine from a bladder, in which there is practically always a variable amount of cystitis and infection, to drain into the peritoneal cavity.

Operative and postoperative hemorrhage have been responsible for a large number of deaths following prostatectomy. The open operation affords accurate control of the operative hemorrhage and has decreased materially the incidence of immediate postoperative hemorrhage. Most of the bleeding after enucleation of the prostate occurs at the neck of the bladder and can be controlled accurately by interrupted sutures. Bleeding from the capsule of the prostate should be controlled by a gauze pack, or bag, or by other means, since the patients cannot stand the loss of blood.

The age, renal insufficiency, cardiovascular changes, and so forth, in patients with prostatic hypertrophy are factors which produce the narrow operative safety zone, and it is conceded that the least amount of operating necessary to remove the mechanical obstruction at the vesical neck is desirable. This has led to the quick blind enucleation which requires only a few minutes and a small amount of anesthesia, but which affords no means of controlling the bleeding that in some instances is very profuse, and even causes death.

Frequently multiple small diverticula coexist with benign hypertrophy in a markedly trabeculated bladder and usually are of no consequence. The diverticulum of an ounce or more capacity must usually be dealt with surgically. Diverticula have been overlooked frequently, and in many such cases the oversight has been responsible for incomplete relief after prostatectomy. The growing incidence of diverticula has been explained by cystoscopy and the open suprapubic operation, and their treatment has increased the percentage of satisfactory results from prostatectomy.

Vesical stones associated with prostatic hypertrophy often present a definite complication. While the removal of a stone at the time of prostatectomy does not add to the difficulty of the operation, the presence of single or multiple stones and the associated cystitis are responsible for the renal insufficiency which may be so serious as to contraindicate prostatectomy at the same time. Usually the residual urine and the resultant infection of

the urinary tract are sufficient to require preliminary drainage of the bladder, which almost always must be suprapubic, because a urethral catheter is seldom tolerated in the presence of vesical stones. Consequently under these unfavorable conditions removal of the prostate at the time of cystostomy for removal of the calculus has been accompanied by a higher mortality rate than has enucleation of the gland several weeks subsequent to the removal of the stone and drainage of the bladder.

The frequency of cardiac and pulmonary complications of patients with prostatic hypertrophy is diminished by the preliminary treatment and the proper selection of the anesthetic. Most patients with benign prostatic hypertrophy can be operated on safely under ether anesthesia, but if cardiac or pulmonary lesions exist, combined sacral and abdominal infiltration or spinal anesthesia is indicated. Complete relaxation and anesthesia are obtained by either method, so that the open operation may be performed with practically a negligible risk from the anesthetic.

*Postoperative Complications:* Postoperative pulmonary complications are infrequent, largely because the patients are kept in bed a short time. Death from pulmonary embolism is rare.

Postoperative uremia, of interest on account of its present relative infrequency contrasted with its frequency before the value of preliminary drainage of the bladder was recognized, develops only in patients in whom back pressure in the kidneys and severe infection have caused so much renal damage that it cannot be repaired entirely by bladder drainage. Most of these patients, however, improve so much after drainage of the bladder that when symptoms of uremia occur they usually respond to maintenance of the body fluids and elimination.

Hemorrhage immediately following operation is usually of little concern when an open operation has been performed and the hemorrhage has been controlled during operation. Late or secondary hemorrhage occurs occasionally and at times is profuse. It is often caused by catheter manipulation, and is best controlled by removing all catheters and avoiding vesical irrigations. In some instances transfusion is necessary. Hemorrhage postoperatively lowers the resistance to infection, and usually is followed by diminished urinary output, with increased liability to uremia, and sometimes by temporary complete suppression of urine. The incidence of postoperative hemorrhage can be minimized by avoiding postoperative irrigations of the bladder and unnecessary manipulation of the drainage tubes.

Infection is always a source of great concern during the convalescence. Cystitis usually is associated with any amount of residual

urine, and a consequent pyelonephritis may be severe. Drainage of the bladder accomplishes much in the reduction of the infection in the urinary tract, but there is always a variable amount of cystitis in all cases that come to operation, and the infection is immediately disseminated to the paravesical space when the bladder is opened. To open the bladder which is distended with urine or which has been filled with water just before operation increases the liability to paravesical infection by flooding the operative field with infective fluid, and has been responsible for severe infections in the space of Retzius and the sloughing wounds, which are obviated largely by emptying the bladder with a urethral catheter immediately before the operation, instituting thorough drainage of the space, and making a moderately loose closure of the abdominal wall.

Epididymitis may occur with prostatic hypertrophy, not necessarily after operation, but often during the period of preliminary preparation. Its incidence is higher in patients who are subjected to intermittent or permanent drainage of the bladder by urethral catheter before operation and in patients in whom a urethral catheter is used postoperatively. The greatest care in cleanliness, in introducing catheters, in using instruments under aseptic conditions, and isolating the patient with epididymitis has decreased the incidence of this complication very materially.

The internal sphincter at the vesical neck ceases to functionate as a sphincter when it is dilated by intravesical enlargement of the prostate and allows the bladder and prostatic urethra to become a continuous cavity with the ejaculatory ducts, emptying into it at the verumontanum just above the external sphincter muscle. The same condition exists after removal of the prostate. The introduction preoperatively of a urethral catheter into the bladder in the presence of cystitis and infected urine in the prostatic urethra and its introduction postoperatively in the presence of infected urine in the prostatic capsule favor the extension of infection to the epididymis by way of the ejaculatory duct, seminal vesicle, and vas. The infection may be bilateral or unilateral. It was bilateral in nearly a fourth of the patients in the Clinic in whom it occurred; when unilateral, it occurred with equal frequency on each side. Usually infection in the epididymis does not proceed to suppuration, but occasionally incision and drainage are necessary, and in some instances recovery has not occurred until castration has been performed.

A persistent suprapubic sinus is usually due to incomplete removal of the obstructing prostate, a transverse bar at the neck of the bladder, stricture of the prostatic urethra, a



large diverticulum which has been overlooked, or the use of nonabsorbable suture material. Enucleation of a large intra-urethral prostate at times leaves a transverse bar posteriorly at the bladder neck, between the bladder and prostatic urethra, which interferes with complete emptying of the bladder by urethra. This bar can be eliminated readily as soon as the prostate has been enucleated, by making a V incision of the bar back into the trigone, as described by Walker.

Even though the entire prostate is enucleated, remnants of the prostatic capsule may be left if a blind operation is performed, and, when the vesical neck contracts subsequently, produce obstruction by ball-valve action at the urethral orifice. Why large diverticula should retard or interfere with the closure of the suprapubic sinus is difficult to explain, but cases have been observed in which no other cause could be found, and closure of the sinus has occurred after removal of the diverticulum. Stricture of the prostatic urethra, even when its entire circumference has been removed, is rare, but it occasionally occurs and requires dilatation. The open operation of prostatectomy affords the opportunity of accuracy which eliminates the possibility of incomplete removal of the prostate and oversight of a diverticulum or of a transverse bar formed by the neck of the bladder and the prostatic capsule.

I have referred to infection of the genitourinary tract only. General sepsis occasionally occurs when the prostatectomy has been performed in the presence of a great deal of local infection, but probably the most common cause is the indiscriminate use of the urethral catheter postoperatively in an attempt to close the suprapubic sinus. The prostatic capsule during the first two or three weeks after operation is an infected granulating surface. A urethral catheter carefully introduced without trauma to the prostatic capsule during this period is usually harmless, and its use hastens closure of the suprapubic sinus. However, when difficulty is encountered in passing the catheter, the prostatic capsule may be traumatized severely; the infection may be disseminated into the blood stream, and general sepsis produced. Empyema, suppurative arthritis, meningitis, and so forth may develop.

In order to reduce the complications attending the surgical treatment of hypertrophy of the prostate the following points should be emphasized:

1. The preliminary preparation of patients with prostatic hypertrophy improves their general condition, increases the renal function, reduces infection, and decreases the liability to postoperative uremia.

2. The open suprapubic technic enables the

surgeon to perform an accurate operation under the eye, to control bleeding, and to deal with coexisting lesions of the bladder.

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#### DISCUSSION

DR. FRANKLIN R. WRIGHT, Minneapolis: The subject Dr. Hunt has chosen is such a large and important one that, instead of limiting my remarks simply to what he has said, what I shall say may be considered rather supplementary to his paper.

The complications of prostatectomy divide themselves naturally into three groups, those which occur at the time of operation, those which immediately follow operation, and those which take place during healing. Those which take place at the time of operation are the accidental opening of the peritoneum and should be taken care of before the bladder is opened, and then they are harmless. The other complication that takes place at the time of the operation is hemorrhage, which occurs from two places, either from the mucous membrane lining the bladder, or from the covering of the poststatic tumor when that is superficial, or from any attempts to enucleate the tumor from the prostatic sheath we may accidentally puncture the prostatic sheath, opening the pelvic plexuses, and then we will have hemorrhage. When this accident does occur, these patients practically all die. They all practically die because the wound must be packed. You cannot get in there to control the hemorrhage. The man's bladder is septic to start with, and while you may attempt to pack the wound in order to control hemorrhage, the hemorrhage occurs in a septic wound, and invariably the sepsis is so great in these cases that they die on the fifth or sixth day. I have had this accident twice, once in a patient with nonseptic bladder, and once in a patient with a septic bladder, who died on the fifth day from sepsis.

The other complication is hemorrhage coming from the superficial membrane. This we can get at and control by ligation.

As to uremia immediately following prostatectomy, the principal thing is to remember first the preliminary preparation, which should be long enough so that a man can go with an empty bladder for several days before he is operated on. I have had men die under my care who previously were in perfect health; they had perfectly clear urine; they had 600 c. c. of residual urine, and yet died of uremia because the bladder was emptied too rapidly. One of these patients was simply catheterized and died of uremia. The first indication of uremia coming on is manifested by dryness of the tongue, and this will be noticed twenty-four or forty-eight hours before the patient gets any noticeable symptoms you can discover, immediately following operation.

I had a case recently of acute gastric dilatation the same as you would have following abdominal work.

Dr. Hunt in giving his statistics referred to epididymitis as occurring in 50 per cent of the cases. To me this high percentage is rather appalling, as I find in my cases it does not amount to 5 or 7 per cent. I do not know the reason for this except that the indwelling catheter is too often used. In these cases where we have sepsis the posterior urethra is more or less involved and there is injury to the sphincter which controls the seminal vesicles and vas deferens as in the mucous membrane of the posterior urethra. The method by which infection of the epididymis takes place is peculiar. It comes from injury to the epididymis or testicle. A slight blow on the testicle or epididymis causes a reverse peristalsis in the epididymis carrying the infection from the posterior wall of the urethra into the epididymis. In these cases we have obstruction in the process of healing, and when the tumor is enucleated the prostate will contract down almost like a pregnant uterus. The entire mucous membrane of the posterior urethra is always torn off. This contracts like a hollow tube. If the posterior urethra is lined with granulation tissue, during the healing process the epithelium runs through the muscle ends, possibly from the calix from the bladder end, and the mucous membrane is drawn down into the posterior urethra to represent a funnel. I have seen cases in which the lining has furnished me new mucous membrane for the posterior urethra. I have had five cases in which, instead of drawing down the posterior urethra, this funnel has furnished new mucous membrane. The mucous membrane is drawn right straight across the urethra as a diaphragm, so that when you introduce the catheter to its full length you meet with resistance. I have operated on three of these cases on whom I had done the primary operation, and I have operated on two that were operated on by other men, in one of which, according to the diagnosis, it was not right to operate.

DR. G. J. THOMAS, Minneapolis: I think the present low mortality in prostatectomy is largely due to our preliminary preparation and our attempt to diagnose and overcome the complications. The complications are first, urinary retention; second, hemorrhage; third, infection. At the present time I think it necessary to cystoscope the majority of individuals complaining of the usual symptoms of prostatic hypertrophy so that complications can be diagnosed and properly treated. The cystoscope is of definite value in these cases, in addition of course to rectal palpation, to determine the presence or absence of an obstructing prostate, of stone, of diverticulum, of relaxation and etc. I have seen many patients who had symptoms typical of prostatic obstruction and who had a palpable prostate per rectum, but who on cystoscopic examination were found not to have an obstructing prostate that interfered with an outflow of urine. Some of these individuals had the usual relaxation which accompanies tabes; others had a small bar which does not always require operation,

but which can be removed by fulguration or by punch. The cystoscope will reveal the condition of the bladder, whether it contains a stone or a diverticulum, the grade of inflammation, etc. The X-ray also should be used. By this method the diagnosis of bladder, ureter or kidney stone can be made. Frequently stones in the bladder and kidney are found complicating enlarged prostate.

Preliminary preparation is necessary before an operation for the removal of the prostate in all individuals who have more than two ounces of residual urine, or who have an infected urine. When the patient requires preparation other than frequent catheterization to rid him of his residual urine I much prefer suprapubic drainage. This should be carefully done under local or gas anaesthesia. An incision should be made so that the peritoneum can be pushed out of the way and so that the opening into the bladder can be made as high as possible. I prefer a large tube which can be stitched into the bladder to prevent leakage. I also try to sew the bladder to the abdominal wall so that the peritoneum will be less likely to become adherent to the fistulous tract and thus become troublesome when the prostatectomy is being done. When an indwelling urethral catheter is used many complications which are troublesome may arise, as epididymitis, peri-urethral abscess, prostatitis, etc.

Many surgeons do not decompress the kidneys suddenly, that is, they do not remove a large amount of residual urine at one time as they fear collapse of the patient and hemorrhage from the kidneys. They prefer to remove small amounts of urine repeatedly. I have never seen worse results or complications occur when removing all residual urine than when removing small amounts. In my opinion relaxation of pressure in itself has little to do with symptoms which frequently follow the removal of residual urine. I do think that infection after such manipulation is the cause of the patient's symptoms which may some times end in death.

The worst complication that one has to look for in prostatic surgery is hemorrhage. This can be controlled, as Dr. Hunt very nicely describes, by a complete exposure of the bladder by stitching of the torn ends of the bladder mucosa and prostatic capsule together with gauze pack within the capsule.

DR. HUGH CABOT, Ann Arbor, Michigan: I am exceedingly glad to get into this discussion; my only difficulty is how I should stay out. The modern situation in prostatectomy is the result of an attempt to produce safety first. In other words, to make the operation fool-proof, and as Dr. Hunt has outlined, the plan which they carry out, which is now almost universal, has succeeded in making the operation fool-proof.

The great mortality in the past was due largely to the fact that we expected of these patients an amount of resistance to trauma which no group of patients would have satisfactorily stood. What did we do? Many of you did what I did. We opened the obstructed bladder; we decompressed the kidney which had been working against obstruction for



months or years, and we created a surgical wound which was the nicest possible method of infecting the patient. In other words, we punched him three times in the same place. We robbed him of his kidney function by decompressing his kidney; we gave him an infected wound in the prostate, and expected him to get well. Curiously enough, he did not do it.

The most important thing we have to do in the preliminary treatment which, after all, is the key to the situation, is the production of a temporary immunity. Many of these patients, though they have had infected urine and infected kidneys, are still quite capable of getting another one. We see in these cases a reinfection of the kidney. In other words, their immunity to the infection, which is apparently generally a colon bacillus infection, is not sufficient. Whatever else we do in the preliminary drainage we must be sure the kidneys have sufficient protection.

I have long believed the greatest cause of death, after a properly planned operation, was bleeding. These patients do not die of hemorrhage. The number of patients any one of us have seen die of hemorrhage is negligible. It is said they die of sepsis, of uremia, of pneumonia. They do not do anything of the kind. They die of hemorrhage, by which I mean that we reduce their resistance by depriving them of their blood volume and circulating medium to a point where they are quite incapable of resisting the dangers to which they are exposed, and they die of any one of a dozen things.

I do not at the present time do the open operation with suture. I am not sure that I was not the first person that did it, and I did it for a considerable time but I have come to believe that I get equally good results without it.

The control of hemorrhage can be satisfactorily achieved by the use of the Hagner bag, and there are very few cases in which that does not give you a really dry bladder.

For general purposes in this operation, as in any operation, simplification of the technic is important, and I have doubt as to whether the open dissecting operation will remain. It seems to me unnecessarily complicated. I believe we can get the same results in other ways, and if that be true, we shall go in this department of surgery as in others from the phase of complication to the phase of simplification. I do not think it is true that one cannot deal with the complications found in the bladder, or cannot discover them satisfactorily without a wide open operation. The discovery of diverticula in the bladder does not require wide opening of the bladder. You can see with the cystoscope diverticula which you find with the greatest difficulty with the bladder open. The finding of stones does not require a wide exposure. It seems to me that the results I am getting by the enucleation operation are superior to those I got by wide open dissection. On the other hand, the improved technic of Dr. Judd has produced a much more perfect operation than the one which I employed. It is a wonderful piece of surgical technic. The whole question will turn on whether we can simplify the

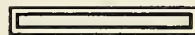
operation and do all necessary work without so much of an exposure.

DR. R. E. FARR, Minneapolis: I want to refer again to the proposition of negative intra-abdominal pressure, to visual examination of things, and to instrument dissection. It is gratifying to see surgeons more generally appreciating the fact that a good exposure makes it possible to do a better operation. If there is any place on a patient, who is severely handicapped, that you can do an operation by this plan, it is enucleation of the prostate. We have patient after patient with a pulse never going above 75 from the time they enter the hospital until they leave, unless there is infection or some complication. I refer to the 4-ounce caudal procain injection, suprapubic infiltration, opening the abdomen without pain and opening the bladder without pain. Using a mild spring retractor and the Trendelenburg position the bladder will balloon, it will hang in its normal position and the intestines will drop out of the pelvis so that anybody can look at the prostate without introducing the finger into the rectum or using an instrument.

In Surgery, Gynecology & Obstetrics I have recently described a modification of Young's Retractor, which goes into the internal urethra. It is a much better instrument for prostatic work than any I have previously used. I have photographs of old men smiling, with the prostate still in situ but showing above the abdominal wall. With this instrument one can lift the prostate out, in many cases, and remove it in much the same manner one would remove tuberculous glands of the neck.

DR. HUNT (closing the discussion): Because of the kind consideration I have received at the hands of those who have discussed the paper, there is very little to say further on the subject.

What has caused us to employ the open exposure in the one-stage operation, and in the vast majority of cases of the two-stage operation is that we often do a preliminary suprapubic drainage, which in some instances is not accompanied by exploration of the bladder on account of the poor condition of the patient. To do the second stage as a blind enucleation accounts for the occasional oversight of a diverticulum. While with the cystoscope a great many of these diverticula have been diagnosed and have been recognized, occasionally they are not recognized by cystoscopic examination. However, there is the argument which Doctor Cabot brings forth, namely, the least amount of operating we can do to enucleate the prostate the better are the chances of recovery for the man who is potentially uremic. Recognition of the fact that men with prostatic hypertrophy, particularly if there has been any amount of residual urine, are potentially uremic, and that their treatment before operation has been responsible for the diminished operative death rate.



# SOME ESSENTIAL POINTS IN THE TREATMENT OF INFANTILE PARALYSIS\*

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Infantile paralysis formerly was, and in some localities still is, called acute anterior poliomyelitis. The name owes its origin to the belief that the virus involved only the anterior horn cells of the spinal cord, thus giving rise to the motor paralysis of a more or less localized area. Advanced pathological and clinical studies have shown that not only the anterior cells but the posterior and even the white matter as well are involved. It becomes necessary, therefore, to revise the name and the one generally accepted is acute poliomyelitis. Essential paralysis of children, likewise has given way to the broader term, as adults as well as children become victims.

Draper, in his excellent little book entitled "Acute Poliomyelitis," has given us a comprehensive but brief description of the history of the disease. He says that the first observations on the disease in its clinical aspect were probably made by Underwood as early as 1774. He pointed out that children might suddenly become paralyzed after a brief illness. Sixty years later Badham, an English physician, called attention to the fact that a group of children in one locality might develop paralysis after a short acute sickness; thus calling attention to the epidemic tendency of the disease. But the first systematic clinical picture was drawn by Jacob von Heine in 1840. Von Heine was an orthopedic surgeon and his experience with many paralyzed children led him to investigate the original cause. This disclosed the fact that there was an initial sickness attended by a febrile reaction and this at times was so slight as to escape the notice of even the parents. The paralysis usually followed the acute illness after a few days. Strumpell in Vienna, was the next writer about 1884. In 1889, Medin described the then prevailing epidemic in Sweden. He pointed out that the condition was an acute general infection, quite frequently not attended by paralysis. Silence next until 1905 when Wickman

described another great epidemic in Sweden. He called the type of acute infection, not giving rise to paralysis, an abortive type. This probably was a misnomer as we now regard the paralysis as a sequel and complication of the acute infection rather than as the disease per se. In 1907 Strauss pointed out the fact that the lymphatic tissues throughout the body were involved.

Experimentally, Landsteiner and Popper, in Vienna, were able to produce the paralysis in monkeys as early as 1909, but they were unable to transfer the virus from one monkey to another. This remained for Flexner and Lewis to accomplish a few months later in this country.

In 1914 Flexner and Noguchi published reports of the cultivation and isolation of an organism that seemed to be constantly associated with infantile paralysis. I believe that there is still considerable controversy over the identity of this organism.

The type of individual that is most susceptible to the disease, according to Draper, is the large, well developed child with a broad forehead and a broad round face. The teeth are often widely spaced, especially the central incisors. Among adults and adolescents the robust type is not the rule. Especially among the fatal cases one finds a more delicate individual.

The most susceptible age is the first decade. The greatest number of cases occur between one and six, although no age seems immune. One victim sixty years of age was reported here in Duluth by Dr. Fahey. Boys are slightly more susceptible than girls.

Turning to our pathological findings we get our first clue as to why the initial paralysis is always the greatest. On opening the skull of a patient dead of poliomyelitis one finds the meninges injected and swollen. There is a bulging of the gray matter on section. The ganglion cells are swollen. The microscope reveals a small, round cell infiltration about the horn cells both anterior and posterior. The pressure of this infiltration causes the initial paralysis and as it is relieved the paralysis clears up. Any permanent paralysis is due to the destruction of the horn cells, either from pressure necrosis or direct toxic effect of the virus or both. Aside from the condition pres-

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ent in the brain there is a general lymphatic hyperplasia.

The symptoms of acute poliomyelitis may be very vague with mild drowsiness and slight fever. Paralysis may or may not follow. The typical picture, however, is somewhat different. The child may complain first of headache. There is usually some soreness of the throat. He soon ceases his play and lies down. He does not want to be disturbed. The temperature may be as high as  $103^{\circ}$  or  $104^{\circ}$ . There may be gastric disturbances with nausea and vomiting. Probably the most characteristic clinical sign is the resentment displayed by the patient when even the mother attempts to move or even touch it. The resentment may take the form of a whining complaint almost dog-like in character. How different this picture is from the usual desire of the child to be held and his discomfort relieved by the mother-touch! This point has been stressed many times by observers who have had opportunity to see a large number of acute cases. The explanation is found in the fact that any movement of the spine impinges on the swollen ganglion cells. To prevent this the child lies with his chin tilted up and the spine rigid or slightly concave dorsally. The position often approaches opisthotonos. There may be a slight intermission in the fever before the paralysis appears. At this time there is usually a varying degree of tenderness in the muscles increasing up to the point of paralysis.

Early during the first few hours the spinal fluid is usually clear and escapes under slightly increased pressure. The globulin is slightly positive but there is little change in the cellular content. When signs of meningeal involvement commence the cell count usually increases and may be as high as 1500 to 2000 cells per cubic millimeter.

Regarding the prognosis one must be quite conservative. Mortality may be as low as ten per cent or as high as twenty-five. Many of the deaths are due to paralysis of the respiratory muscles. Baer feels that the mortality can be lessened by the use of the pulmotor when respiratory failure is imminent. He reports one child that was kept alive four days by this method and the end came through failure to secure a new supply of oxygen promptly enough. As to the paralysis the out-

look is somewhat more favorable after the early administration of immune serum. In monkeys the paralysis can be prevented by injecting the serum immediately after innoculating with the virus.

Treatment is divided into three stages—the acute, the convalescent and the chronic. The first covers a period of a few days to six weeks. The second extends from the end of the first stage through a period of about two years. The last stage begins when there is no longer any hope of spontaneous recovery and should continue as long as the patient needs any attention.

During the acute stage one resorts to the early use of serum and attempts to relieve the pain in the tender muscles and prevent deformity. The serum should be given both intravenously and intraspinally. First and foremost we are dealing with a systemic infection; hence the need for the intravenous injection. The intraspinal treatment should be given at the earliest indication of involvement of the central nervous system. The serum that has been found most effective has been that obtained from patients recovered from polio from five months to five years.

One of the distressing features of the disease is the pain and the tenderness in the muscles that are involved and the fear of being moved. There is danger of deformity formation. This is best treated, perhaps, by the use of the so-called plaster bed. The plaster bed is made by wrapping the child in sheet-wadding from head to foot and then applying a plaster cast with all of the joints in a position of least deformity. The cast is then bisected and the front half removed, leaving the lower half for the child to lie in. When it is necessary to move the patient this can be done with no discomfort to the child by simply lifting the lower plaster shell with the child. Where only a leg or an arm is involved the plaster bed is not necessary.

When there is danger of respiratory failure one should use the pulmotor as mentioned before. It may be necessary to continue its use for several days but one is spurred on by the knowledge that the paralysis often clears up rapidly. The fleeting facial involvement often seen is an example.

The second stage begins when the tender-

ness has left the muscles. From this time forward there should be the greatest care taken to prevent deformity and to guard against over-stretching of weakened muscles. The muscle tone and muscle nutrition must be closely watched and every effort made to improve same. Muscle training also belongs to this stage. No one can tell at this time which muscles will recover and which will not. Even those that show the electrical reaction of degeneration have been known to recover while some that have not shown this reaction never function again.

Taking up first the task of preventing the over-stretching of weakened muscles. I should like to lay heavy emphasis on the danger of neglecting this phase. It is, of course, a well known fact that the more highly specialized a cell is the harder it is for nature to rebuild it. Muscle cells are quite highly specialized. We are dealing, not alone with a muscle whose nerve supply is diminished or gone, but also with one whose nutrition is impoverished and whose circulation is very sluggish. One has but to look at the edematous, cyanotic extremity of a polio case to realize how true this is. How easy, then, to injure cells in this condition! Therefore one of the first necessities is to protect a weak muscle from its strong antagonist. If we have a weak *tibialis anticus* and *peroneus tertius* opposed by a strong *gastrocnemius* and *soleus*, a right-angle brace or cast should be prescribed to be worn both night and day. If one keeps the brace on during the day but allows the foot to drop down into equinus during the night, all the beneficial effects of the day are lost during the night. If the *erector spini* group is weak, the patient should not be allowed to sit without a body cast or an efficient brace to support the back. Lovett has shown through his method of measuring muscle strength that a denervated muscle tires very quickly and that later attempts at function are nowhere near as effective after this fatigue has been allowed to develop; hence we must be very particular to prevent stretching of and injury to the stricken parts.

Thus far I have spoken of preventing injury to muscles *per se*. Let me indicate the difficulties attendant upon unprotected joints. Let us return to a supposed case of muscles paralyzed on the anterior portion of the lower

leg while the posterior muscles are strong. The foot, of course, is pulled into equinus and as this is not corrected the *tendo-achilles* gradually shortens and it becomes impossible to bear weight on such a foot—the weight must be borne by the toes if at all. Suppose the hamstrings are strong and the quadriceps weak or gone. The knee must needs flex and the hamstrings will contract until it is impossible to obtain full extension at the knee. Another most common deformity is met with in the hips. Patients that cannot walk are allowed to sit all day in a chair or on the bed. This allows the *tensor femoris* and *sartorius* to contract and soon full extension at the hips is impossible. Scoliosis is also very common. In these cases before any brace can be applied or any walking done these contractures must be overcome, either by stretching under anesthesia or by tendon-lengthening or straight tenotomy. Of course valuable time is lost and it is impossible for any power to return to the weakened muscles when they are stretched to the utmost of their capacity. I realize quite fully that these matters which I have been pointing out seem simple and obvious but it is the simple and obvious thing that we are very apt to overlook.

Our next concern is the preservation of muscle nutrition and muscle tone, in so far as we are able. Probably the best way to do this is by gentle and frequent massage. This should be done by one who has been trained in the science of massage and should not be undertaken until all muscle tenderness has disappeared. Electricity has been used quite extensively for this purpose and still is by some but the general feeling in the big clinics is that the massage is just as effective and in most instances, more so. Sir Robert Jones of Liverpool says, "If electricity is desired the constant current can be used, but its advantages cannot be compared with those of posture, massage and exercise." The massage should be continued during the first year.

Muscle training is becoming a very important aid in the latter part of the convalescent period. It is being advocated very enthusiastically by Lovett, in Boston. It consists in encouraging the patient to concentrate on one simple motion and develop control of movement. As this is gained the movement is per-



formed under gradually increasing resistance. With very young patients this treatment is rather difficult, but by first frequently carrying out the movement passively, the child can be encouraged to voluntarily imitate. Lovett devotes a whole chapter in his book, "The Orthopedic Treatment of Infantile Paralysis," to the discussion of muscle training. It requires considerable time and patience, but in his hands the results have been very gratifying.

The last stage—the so-called chronic stage—is the operative and brace stage. No operative procedure should be carried out in less than two and better three years. Up to this time there is a possibility of some of the paralyzed muscles regaining some power. If we were to do a muscle transplantation to a paralyzed part and then the paralyzed muscle should regain function, you can readily see that our deformity would go in the opposite direction and would be as bad as the original one.

On general principles a leg that can be made self supporting is much to be desired to one that is dependent upon a brace. A brace has to go to the repair shop every so often, whereas a functioning leg has an every present master mechanic—nature. A foot that is entirely flaccid can be made self supporting by performing the Whitman operation of astragalectomy. This operation gives one a stable foot that is capable of weight bearing without any additional support. It does make the leg somewhat shorter than its fellow but this can be readily compensated for by putting an elevation on the sole and heel of the shoe. A knee can be made self supporting by doing a resection, but this should never be done before the patient has reached adult life. It is well nigh impossible to do a resection of the knee without injuring the epiphyseal portion of the tibia and femur. When this happens, of course, the leg will no longer grow in length. Therefore it is necessary to wait until a child has grown as much as it will before a resection is contemplated.

A discussion of tendon transplantations to restore the balance of power about joints would carry us too far afield. Suffice it to say that the present day orthopedist, in order to justify his title, must be a surgeon as well as a mechanic. Living up to this standard has improved the success of tendon transfers which

failed before. There is one point, however, which I should like to mention in this connection. Bennett says that in performing a tendon transplant about the foot if it is combined with the Gallie method of implanting the paralyzed tendon into the tibia the percentage of successes will be greatly increased. I have had occasion to observe several of his cases treated in this manner and can vouch for the truth of the statement.

Cases that cannot be made self supporting by operation or muscle training must depend on braces and crutches.

In summarizing the treatment let me emphasize the following:

1. The early use of immune serum both intravenously and intraspinally.
2. A cast or brace should be used to prevent stretching of paralyzed muscles, to relieve the acute tenderness and to prevent deformity. Remember that the appliance should be worn during the night as well as during the day. Any overstretching is injurious.
3. Massage seems to be the best method of promoting muscle nutrition and muscle tone; it also improves the circulation.
4. Muscle training is proving more and more useful, both in the convalescent and chronic stages.
5. Operations should not be performed under two years and resections should not be done before adult life is reached.

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#### THE TREATMENT OF SYPHILIS.\*

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My specific patients invariably ask the following questions at their first consultation: "What is the matter with me? Can I be cured?" and "What must I do?"

Diagnosis then comes first and before one pronounces a person syphilitic one must know

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it to be true or a great injustice is done. One must also make the diagnosis as soon as possible.

"Can I be cured?" depends largely on our criteria of cure, the progress the disease has made in time, the lesions present and other known or unknown factors. Possibly the only absolute criterion of cure is when the patient contracts the disease a second time.

"What must I do?" is answered by our knowledge of the disease and of the value of our therapeutic efforts and the art of their proper use.

Not all my luetic patients consult me in the initial stage of the disease, but most patients consult some one at that time and a definite diagnosis is not always made when it should be. This last is unfortunate as I firmly believe that the time to cure syphilis, if an absolute cure is possible (and I believe it is in many instances) is in the early primary stage of the disease. At this stage the diagnosis may be made by our clinical knowledge and experience with the disease and confirmed definitely by the finding of the *treponema pallidum* in the serum of the primary lesion. The Wassermann test at this time is of little value or importance and the delay of a day or two necessary for the performance of the test may mean ineffective therapy and many more days of treatment.

We will assume the diagnosis is made at this time. Then make as thorough an examination as you can of the patient's general condition, as it may influence your treatment, because you are going to use powerful drugs which may cause undesirable reactions. If satisfied that the patient's condition is good, begin treatment with arsphenamine (or its modifications) and mercury and administer them early and often.

Several injections of arsphenamine (not any of its worthless substitutes) either combined or followed by mercury will accomplish more at this time and with less danger of undesirable reactions than much more therapy at a later date. Treatment at this time is often curative while treatment later may be just treatment.

Arsphenamine is a spirilloicide and is preferably given by the intravenous route. The subcutaneous, intramuscular and rectal administrations are undesirable. The intraspinal administration of arsphenamine or of arsphenaminized serum has never been advocated at this stage of

the disease and is illogical and unnecessary and inadmissible at any stage of the disease. It is simply a more difficult and more expensive way of doing a relatively simple thing. The dose given is too small to be efficient and the drug when so given does not reach the essentially nervous tissue.

Mercury is best employed by injections (most efficient when intravenous) or inunctions. I do not go so far as to say that given by mouth it is useless, as some would have us believe, but it is certainly less efficient when so given and often has disadvantages overshadowing the simplicity of administration. Mercury, unlike arsphenamine, probably acts on the body cells that have been functionally changed by the poison of the disease, the toxin producing an inversion of the lipid metabolism of the organism. I might say here that the detection of this inverted lipid metabolism may occur in conditions other than syphilis. Various forms of mercury may be employed; all are efficient but some have preference because of their solubility or insolubility or non-irritating effects, etc., according to their mode of application.

The combined arsphenamine and mercurial treatment, then, is scientific and confirms the practice generally followed by clinicians. With arsphenamine we try to exterminate the infection and with mercury restore the function of the body cells.

Iodine is of great value in causing the disappearance of many lesions of the later stages of the disease; while not regarded as of the same specific value as arsphenamine or mercury its effects are sometimes marvelous. None of the many preparations of iodine have any advantage over potassium or sodium iodide. Given by the mouth the drug is as therapeutically active as any other method of administration.

The treatment of the luetic in the secondary and later stages of the disease is similar to that of the initial stage, only more prolonged and perhaps less energetic unless the involvement of some special organ is grave enough to require immediate relief. Treatment, here, is less efficient and the chances of untoward reactions from the drugs employed, especially arsphenamine, are increased, as the tissues are saturated with the infecting agent and undermined by the disease. Unfortunately many of the undesirable



effects of arsphenamine are at the present time inexplicable.

In the so-called parasyphilitic stage of the disease (tabes and paresis) permanent damage has been done to the brain and spinal cord before the diagnosis may be made and no amount of antispecific treatment will restore function to dead neurons.

As to the value of the Wassermann test in diagnosis. The theory that it was a specific test was soon proven untrue. The test is useless for early diagnosis, of supplementary value only in secondary syphilis, of some use in the so-called latent and obscure syphilis, and of practically little value in para-syphilis. That is to say any of the classical symptoms of syphilis are of more diagnostic value than the Wassermann test. Its value in directing treatment is about the same as its value in diagnosis.

The last statements apply when the test is made by the highly trained serologist and when made by the non-expert the test is of still less value. The same serum in a certain percentage of instances gives divergent results in the most expert hands. The factors entering into the causation of such results, if not technical errors, are inexplicable or the expert would not let such discrepancies occur. When the test is made by a non-expert errors are multiplied. The factor of error, however, should not always be put on the serologist. He knows nothing of the patient's condition when the blood was taken and the disturbing factor may be in the blood at the particular time it was drawn or due to changes in the blood before reaching the laboratory or to faulty technique in obtaining it.

The assumption that a patient is syphilitic when the only evidence is a single positive Wassermann test is absolutely unwarrantable. The absolute faith that many physicians, the public, Boards of Health, and our courts have in this test is surprising. In many instances it may justly be said that the result of the test often brings with it more problems than it removes.

In illustration of all that has gone before in this paper I am going to cite three short histories.

*Case 1.* A woman with a well marked secondary lues, and a positive Wassermann test, was sent to a detention hospital. While there she received at least one injection of arsphenimine (the number is unim-

portant). Her husband took legal steps to secure her release. The court ordered a Wassermann test. It was made and reported negative. The woman was released, although the papular syphilides on the body had not faded out.

*Case 2.* A man of 35 years contracted syphilis in 1871, took treatment in a desultory way for a few months, was married in 1876 and has three children all living and well. His wife died several years ago, aged 72, of kidney disease. He consulted me in 1918 for a varicose ulcer of the leg. Aside from this and some arterio sclerosis he was in good condition. A Wassermann test taken at that time was reported positive. He is at the present time 84 years of age and 49 years after his infection able to attend to his business.

*Case 3.* This man gave a doubtful history of primary syphilis eight years ago. No definite diagnosis was made, but treatment was advised. He took pills for eight months; a year later an injection of salvarsan and two more in later years. His last treatment was in 1916. In 1920 he begun worrying about his condition and in an interval of seven weeks consulted seven physicians and had ten Wassermann tests. Four of the physicians gave him a clinical examination and three simply advised him to have a Wassermann test made. Four of the Wassermann tests were positive, four were negative and two were doubtful. The tests were made in six different laboratories. None of the four physicians who examined him clinically could find any organic trouble.

Comment is unnecessary. (Case I).

What is our criterion of cure? (Case II).

What is the status of this patient and what is the value of the Wassermann test as ordinarily performed? (Case III).

Now just a word or two more. Medicine has been defined as a science in its methods of study and an art in its application. Syphilis has been studied clinically for 400 years while the valuable contributions of the laboratory to its study are of comparatively recent date. Our accumulated clinical knowledge of the disease is just as good science as the contributions of the laboratory worker. Clinical experience has given us little to be forgotten and much to be remembered and laboratory science has in the main but confirmed our clinical experience. Without the art of applying our knowledge, laboratory science would be of little benefit to our patients.

We must not, therefore, be blinded by the glare of laboratory science, but consider all aspects of the disease in making our judgments and remember that we are treating individuals for syphilis and not syphilis alone.

## THE LABORATORY DIAGNOSIS OF SYPHILIS\*

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The literature pertaining to the laboratory diagnosis of syphilis is voluminous and varied. It covers a host of subjects, some of which have little in common except as they refer to the symptom complex of syphilis. On account of the broad scope of the subject, it is impossible to include all laboratory methods of value, nor can reference be made to extensive experimentation.

The purpose of this paper is to collect and correlate some of the laboratory diagnostic aids which relate to the various stages of syphilis and present these in somewhat connected form for the benefit of the practicing physician. In so doing, it is important that a general summary may be obtained which will emphasize some of the conclusive, practical factors involved in the subject.

*Animal Inoculation.*—Thus far animal inoculation has found no practical place in the diagnosis of syphilis. This, however, does not preclude the possible practicability of such a procedure, nor does it for a moment mitigate against the great importance attached to this phase of experimental work. The clinician and pathologist have much to learn concerning syphilis. The syphilologist and bacteriologist are far from familiar with the spirocheta pallida. It is probably true that better knowledge exists concerning this organism than that pertaining to other spirochetes. Much remains to be accomplished in developing knowledge concerning the biologic characters of the spirochete group and the pathologic conditions caused in their hosts. There remains for investigation and solution some thirty specific infectious diseases of unknown etiology in connection with some of which spirochetes may possess some etiological significance. The brilliant researches which have been made on the spirocheta pallida have led the way for the future development of knowledge concerning the whole spirochete group. Experimental studies therefore, relative to this organism constitutes

a valuable contribution for the literature.

Brown and Pearce<sup>1</sup> of the Rockefeller institute for Medical Research, during the last year have published a most interesting series of five articles on the subject of experimental syphilis in the rabbit. Primary skin lesions in the rabbit were first reported by Hoffman, Löhe and Mulzer<sup>2</sup> in 1908, scrotal infection by Ossola<sup>3</sup> in 1909 and infection of the prepuce by Levaditi and Yamanouchi<sup>4</sup> in 1908. Valuable data is being collected bearing especially upon the incubation period, the specific early reaction following inoculation of the scrotum, skin and mucous membranes, specific scrotal chancres, the early spread of the virus around the area of the primary lesion through the perivascular lymphatics, the course of alopecias, onychia and paronychia lesions of the skin proper with the dermatological manifestations of generalized infection, the selective distribution of cutaneous infection and finally the character of the lesions on the mucous membranes.

The work of Brown and Pearce is of course not conclusive. In a personal communication from Baeslack, he states that all animals, especially rabbits, if not kept on a varied diet and in clean cages will develop skin lesions due to a saprophytic spirochete. In over eight hundred rabbit inoculations made by Baeslack no cases of generalized syphilis developed.

Eberson<sup>5</sup> reports the isolation of the spirochete from the blood and lymph glands of experimentally infected rabbits as early as seven days after testicular inoculation and before the appearance of the initial lesion.

*Diagnosis of Syphilis by Culture.*—Great stimulus was afforded the study of syphilis when it was found, a number of years ago, that the spirocheta pallida could be successfully grown on artificial culture media. As yet, cultural methods are not available as a practical routine aid in the early diagnosis of the disease. From 1910 to 1912 Noguchi<sup>6</sup>, Mühlens<sup>7</sup>, Baeslack<sup>8</sup>, and E. Hoffman<sup>9</sup>, were busily engaged in attempting to grow the spirochete in artificial culture media. These four investigators succeeded almost simultaneously. They found that the culture media consisting of plain or ascitic, inactivated horse serum agar afforded the best soil for the growth of the spirochete. Such a medium is placed in deep tubes and it is well to add to each tube a small

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piece of fresh rabbit kidney or testicular tissue.

Cultures of the spirochete after incubation of from five to seven days show a distinct growth along the line of inoculation. The culture shows a characteristic faint cloudiness throughout a considerable portion of the medium, especially in the bottom layers. No growth takes place in the upper layer of the medium as the organism demands anaerobic conditions.

The writer very distinctly remembers a most interesting visit with Dr. Mühlens in his laboratory at Seemanskrankenhaus und Institut für Schiffs und Tropenkrankheiten, Hamburg, in 1912. At that time Mühlens was not able to secure cultures from lesions on rabbits, all of his cultures having been secured from the original chancre. His work attracted considerable attention and many laboratories were begging him for transfers from his cultures.

At the same time, Noguchi of New York and Baeslack of Detroit were meeting with success in their attempts to cultivate the spirochete. Noguchi, as the result of his culture work, developed luetin. The luetin test was quite extensively used in the army during the recent war.

Baeslack and Keane<sup>10</sup> recommend the use of cultures for the diagnosis of certain cases of primary syphilis in which the suspected initial lesion does not present typical appearance on account of previous treatment with calomel, escharotics and antiseptics. In such cases satisfactory dark field examinations are made with difficulty. Since the spirocheta pallida appears to remain viable in the tissue for a period of at least twenty-four hours after removal it is recommended that such specimens could be placed in tubes of bouillon, sealed and forwarded to laboratories for diagnosis according to this method.

*Microscopic Diagnosis of Syphilis in Initial Stage.*—Reference has been made to the important work of Brown and Pearce and of Eberson, the results of which are of significance in connection with the early diagnosis of syphilis. The results indicate that after inoculation with spirocheta pallida the organisms may soon begin to multiply and spread by continuity through the surrounding tissues. Furthermore, it seems apparent that they soon may gain access to the lymphatics and blood stream

and thereby be swept over the body. These researches show that such conditions may occur before the clinical diagnosis of initial syphilis can be made.

The importance of the early diagnosis of syphilis is well expressed by Tauber<sup>11</sup> who states that, "the early diagnosis of syphilis is an unknown quantity to many men who are practicing medicine in our times. The first week or so of the initial lesion, while syphilis is still a local condition, is the time that we employ every energy and endeavor to our diagnostic and therapeutic armamentarium to cure, for never again in the picture of syphilis for the individual patient or the state will this moment return."

In collecting material from the suspected chancre use may be made of an ordinary capillary pipette, prepared by softening a piece of glass in a bunsen burner. Serum is allowed to flow into the pipette by capillary attraction after which the tube is broken off, sealed and centrifuged for thirty seconds or more. The upper layer of serum is then transferred to a slide for microscopical examination.

If the suspected chancre is healed, Butler<sup>12</sup> recommends that a few drops of physiological salt solution be injected into the base of the lesion and that the tissue be macerated by rotating the hypodermic needle, after which, the saline mixed with serum is aspirated and placed on the slide for examination.

In certain instances the spirochete cannot be found in the initial lesion, either from the surface or by puncturing the base of the lesion. In such cases the microscopical examination may be made of aspirated serum from the regional lymph glands. The lymph gland is firmly fixed between the two forefingers and thumb of the left hand, after which the hypodermic needle is passed through the capsule of the gland. The point of the needle is then rotated to break down some of the glandular tissue, after which one-half to one c. c. of sterile physiological salt solution is slowly injected. The swelling of the capsule under the fingers is noted and after a few more rotations of the needle the mixture of salt solution and macerated tissue is drawn into the syringe and submitted to microscopical examination.

Baeslack<sup>13</sup> recommends the use of a suction apparatus which consists of a test tube drawn

to a fine point, with a side arm for the attachment of the rubber tube, which in turn is connected to a small suction pump or syringe. Cupping tubes of varying sizes are used to accommodate chaneres of different sizes. This method possesses considerable advantage in certain cases as its use does not necessarily cause the flow of blood, but rather results in the collection of an abundance of serum from the lesion.

There are relatively many staining methods described for the purpose of demonstrating the spirocheta pallida. It is not necessary to dwell upon the staining values of spirochetes, inasmuch as this method is not generally followed in most laboratories in connection with practical diagnostic work. The spirochete does not have a strong affinity for basic dyes and therefore staining methods are used more especially in experimental studies.

The india ink method consists simply in the preparation of a smear of india ink mixed with the serum or fluid suspected of containing the spirochetes. This method is followed in many laboratories and affords a convenient procedure but is attended by certain disadvantages. The difficulty lies in securing a properly prepared preparation in spite of the observation of great care.

The dark field examination of suspected syphilitic material is the most reliable method for demonstration of the spirochete microscopically. By the use of the dark field the organisms are examined in living condition and therefore the characteristic movement of the organisms, which is the most important differential sign, is present. The satisfactory dark field apparatus consists of a permanent microscope stand with the dark field attachment and an arc light with reostat. The complete outfit should be placed on a board and after it is perfectly centered and adjusted, should be permanently attached to the board. It is therefore ready for instant use. In the routine examination of initial lesion it is recommended that the suction cup described above and the dark field be employed. Under ordinary conditions, positive diagnosis may be quickly made. Negative diagnosis however, should be reported only after repeated examinations. The appearance of the spirocheta pallida in dark field preparations affords one of the most

fascinating and interesting microscopical observations. The spirochetes, appearing as shining cork screws, actively motile, exhibiting a backward and forward movement, present a dark field picture which is not forgotten.

*Wassermann Test.*—Bordet and Gengou<sup>14</sup> published the method for complement fixation in 1901. Neisser and Sachs used the method to differentiate albumin. Wassermann, Neisser and Brück<sup>15</sup> applied the method experimentally to determine the presence of substances yielding the fixation of complement with syphilitic extracts. Wassermann and others then found identical substances in the serums of syphilitic patients.

The Wassermann test is universally used for the diagnosis of syphilis, notwithstanding the fact that certain phases of the reaction are as yet unexplained. In approaching the subject of the Wassermann test from the clinician's point of view, it is impossible to take up in detail the technique of the reaction. However, for the sake of clearness it may be stated that the Wassermann consists first, in finding the smallest amount of complement (guinea pig serum) necessary to cause hemolysis of a standard amount of red cells (sheep) in the presence of a standard amount ofamboceptor (immune rabbit serum). The second step consists in finding whether this amount of complement (or multiple) will hemolyze the red cells in the presence of amboceptor, patient's serum and antigen, or whether the unknown serum and antigen will "fix" the complement and prevent hemolysis of the red cells.

In submitting specimens of serum or cerebrospinal fluid for the Wassermann test it is well to bear in mind that there are several factors which may influence the results of the test. For instance, it has been found that should the patient indulge in alcohol the substances in the blood serum which react with the lipoids in the antigen may be rendered inert and thus a negative result may be secured from a serum which is really positive. The growth of bacteria such as staphylococci and streptococci in normal blood serum may cause positive results to occur which might otherwise be negative. Therefore it is important that in collecting specimens of serum for test ordinary antiseptic precautions should be observed. Again, there are variations within certain limits in the power of blood



serum to fix complement. With these conditions in mind and after consideration of the technique of the test the delicacy of the reaction becomes obvious and conflicting results as obtained in the hands of different technicians may be regarded more intelligently and perhaps more charitably.

In conducting the Wassermann test it should be remembered that the procedure consists in the proper manipulation of a delicate biologic reaction. In other words, in the technique is involved the use of several biologic reagents, each of which must be carefully prepared. Moreover the reagents must be titrated and preliminary tests conducted in order that the test may be thoroughly controlled and dependent results secured.

Kahn<sup>16</sup> shows the advantage of standardizing the time of incubation of amboceptor and complement titrations and the time of final incubation of tests to a fifteen minute period. The results of his work also point to the importance of titrating both complement and amboceptor daily in the Wassermann test (guinea pig complement, sheep cell system).

One of the most important factors in all complement fixation work relates to the employment of proper antigen; thus in serology, complement fixation tests are utilized experimentally to check up other results in establishing certain organisms as important etiological factors in connection with specific, infectious processes. The question of the antigenic properties of syphilitic material is yet to be explained. The so-called syphilitic antigen in whatever form it is used must not be regarded as a true antigen. It is rather an extract which contains lipoids reacting with lipotropic substances which are contained in the blood serum of the syphilitic individual. Fortunately the action in the Wassermann test is similar to the action of a true antigen. Considerable study has been given to the proper antigen for use in conducting the Wassermann test. The results of these researches have shown that in all alcoholic extracts of normal tissues which have been used as antigens the active principle is contained in the extracts and contrary to the early expectations there appears to be nothing distinctly specific in the presence of *spirocheta pallida* in antigenic extracts. On the other hand, it has been shown that the extracts of

normal tissues give negative results in certain cases in which positive results will be obtained from the use of extracts of fetal syphilitic liver and cultures of the spirochete. Therefore, it is possible that the extracts of syphilitic tissues containing the lipoids may also represent certain specific antigenic substances due to the presence of *spirocheta pallida*.

Varney and Baeslack<sup>17</sup> found that the use of syphilitic gumma from the testicles of rabbits furnishes a more specific antigen than that representing syphilitic or normal tissue.

After reviewing the literature on the study of antigens, one is safe in advising for the routine Wassermann test the use of cholesterinized alcoholic extract of normal beef-heart muscle, and alcoholic extract of fetal syphilitic liver or normal heart. If three antigens are desired, Noguchi's acetone insoluble lipid antigen may be used. From a series of 7,636 cases a comparison has been made of the results obtained from the use of cholesterinized and alcoholic extract of heart muscle as shown in the following table:

DIVERGENCE OF RESULTS IN COMPARISON OF CHOLESTERINIZED AND ALCOHOLIC EXTRACT ANTIGENS.

Table I.

|                           | Cholesterinized |      | Alc. Ext. Antigen |      | % Divergence |
|---------------------------|-----------------|------|-------------------|------|--------------|
|                           | No.             | %    | No.               | %    |              |
| Total 7636                |                 |      |                   |      |              |
| No. Negative              | 5,438           | 71.3 | 5,653             | 74.1 | 2.8          |
| No. ++++                  | 1,818           | 23.8 | 1,650             | 21.6 | 2.2          |
| No. +++                   | 197             | 2.5  | 62                | 0.8  | 1.7          |
| No. ++                    | 150             | 1.9  | 125               | 1.6  | 0.3          |
| No. +                     | 33              | 0.5  | 146               | 1.9  | 0.4          |
| Total per cent divergence |                 |      |                   |      | 7.4          |

Total number cases, 7636. Total number reported positive, 1954. Percentage reported positive, 25.5.

The above results, which concur with those of others, show that positive tests are secured more often from the use of the cholesterinized antigen. In many cases however, in which negative results are referable to the alcoholic extract while the cholesterinized yields positive results certain conditions appear to be responsible. For instance, in some cases of this nature reported in the above table the Wassermann test was applied for the purpose of determining whether or not treatment had been successfully carried out. Without dwelling longer upon this it may be safely assumed that the employment of at least two antigens as outlined above, is not only important but an essential

factor in conducting the Wassermann reaction. By this means each test is afforded a logical method of control and there is less likelihood for the occurrence of faulty reading and the appearance of inaccurate results.

The subject of variations in the Wassermann reaction is one which has received considerable attention. In consideration of this question the following well known facts have been recorded: Positive results may be obtained in cases of leprosy, hepatic disease, frambesia and scleroderma, also in the febrile stages of measles, scarlatina and variola. Serum collected from a patient after the administration of an anesthetic may yield false positive results. Cholesterinized extract may give a slight positive reaction with normal serum. Cholesterinized antigen is more sensitive than acetone insoluble extract of beef heart. If serums are kept for some time, anti-complementary substances may occur which may cause inhibition of hemolysis and result in a false positive. Relative to the last point Breuer<sup>18</sup> tested out the anti-complementary power of seven anti-complementary serums and concluded that, "a high anti-complementary power does not interfere with a clear-cut positive reaction. The question of whether or not it is practical to undertake this titration and repetition of the test after the main portion of the specimen has been run, in preference to getting another specimen, must be left with the individual worker."

The Wassermann test represents a biologic reaction and has its "limits of delicacy." The clinician and serologist should not depend upon a single Wassermann as an indication of freedom from syphilitic infection nor rely upon the so-called two plus or three plus positive Wassermann as a diagnosis of the presence of the syphilitic infection, without taking into consideration all available clinical data pertaining to the case in question.

In consideration of this subject Rohdenburg<sup>19</sup> and his associates have presented the results of a statistical study of 27,956 Wassermann tests. Of these which were clinically active, those resulting positively were 92%. In 3,165 tests on known syphilitic cases certain changes in the results of the tests occurred, as is shown in the following table:

Changes from positive to negative. . . . 69 times  
Changes from negative to positive. . . . 39 times

Changes observed in specimens taken

1 week apart. . . . . 24 times  
Changes observed in specimens taken

2 weeks apart. . . . . 56 times  
Changes observed in specimens taken

12 weeks apart. . . . . 28 times

The authors find no explanation for these fluctuating results, and emphasize the fact that the Wassermann test is not infallible and "its value is greatest when its limitations are clearly comprehended."

Solomon<sup>20</sup> has presented an interesting array of results of Wassermann tests made from the serums of three thousand patients by two independent laboratories, the laboratory of the Massachusetts Department of Health and that of the Boston City Department of Health. In this work there was complete uniformity of results in 93.44% of the cases, leaving 6.56% variations.

It has been determined by repeated observations that in many instances the Wassermann test of cerebrospinal fluid is of great importance. Kingery<sup>21</sup> has presented a study of the spinal fluid of 52 cases of congenital syphilis, Jeans<sup>22</sup> some 214 cases and Ravant<sup>23</sup> 28 cases. The results conform in showing that cerebrospinal involvement is closely associated with prenatal syphilis. The technique employed in obtaining cerebrospinal fluid, when once acquired, is simple and should be followed as a routine procedure by those clinicians who are called upon to do extensive work in this line. In paresis the Wassermann test is positive in practically 100% of the cases, in cerebrospinal syphilis 100% and in tabes 95% of the cases react positively as compared with approximately 70% resulting with the Wassermann test of the blood. In many cases of syphilis in the tertiary stage where there are no clinical evidences of involvement of central nervous system, the Wassermann test of the cerebrospinal fluid yields positive results. The recent work of Wile and Hasley<sup>24</sup> shows that positive Wassermann test upon the cerebrospinal fluid may occur during the primary stage of syphilis when involvement of the nervous system is present. A goodly proportion of cases in the secondary stage, especially in latent secondary syphilis, result positively. It should be emphasized that when conducting the Wassermann test upon the cerebrospinal fluid for the purpose



of the determination of cure of syphilis, negative reactions should be obtained with no less than 1 c. c. of cerebrospinal fluid.

As an illustration of the importance of subjecting the cerebrospinal fluid to test, one case of tertiary syphilis may be cited which was subjected to a long course of treatment, the blood of which, over a period of several years, was submitted to approximately twenty-five tests. The majority of these Wassermanns yielded negative results. Finally when it was deemed advisable to discharge the patient a specimen of cerebrospinal fluid was subjected to examination with positive results. It is recommended therefore, that greater importance should be attached to the Wassermann test upon cerebrospinal fluid and that no case of secondary or tertiary syphilis should be discharged as cured serologically until a specimen of the cerebrospinal fluid has been subjected to test with negative results.

Okazaki<sup>25</sup> has done some work in connection with the Wassermann test upon the aqueous humor of the eye of syphilitics. From his work the author concludes that the positive Wassermann reaction may be secured from the aqueous humor simultaneously with its appearance in the circulating blood.

Graves<sup>26</sup> has contributed an interesting article on the subject of post-mortem Wassermann reaction and its value. This work is of special interest in that the results of the Wassermann tests could be controlled by the post-mortem findings.

Since 1910 it has been known that syphilitics, the serums from whom yielded negative or partially positive Wassermann reactions, would show positive reactions in the blood after the administration of arsphenamin. Gennerich<sup>27</sup> who first noted this phenomenon suggested the name of the "Provocative Wassermann Reaction." The cause of this reaction is not well understood and exception to its value has been taken by Pollitzer and Spiegel<sup>28</sup> However, the probable importance of the provocative Wassermann test in which the serum may show a positive Wassermann reaction from a few days to two or three weeks after the injection of the arsphenamin is shown by the following table prepared by Craig:

Table II.

| Case No | Time since treatment | Time Since Wass. became neg. | Result of Wass. test | Result of Prov. Wass. test |
|---------|----------------------|------------------------------|----------------------|----------------------------|
| 1       | 12 months            | 12 months                    | —                    | ++                         |

|    |           |           |   |    |
|----|-----------|-----------|---|----|
| 2  | 13 months | 13 months | — | —  |
| 3  | 14 months | 14 months | — | ++ |
| 4  | 15 months | 15 months | — | ++ |
| 5  | 16 months | 15 months | — | —  |
| 6  | 17 months | 17 months | — | ++ |
| 7  | 18 months | 18 months | — | ++ |
| 8  | 19 months | 19 months | — | ++ |
| 9  | 20 months | 20 months | — | ++ |
| 10 | 21 months | 21 months | — | —  |
| 11 | 22 months | 22 months | — | —  |
| 13 | 24 months | 24 months | — | —  |
| 14 | 25 months | 25 months | — | ++ |

The interpretation of the results of the Wassermann test is a broad subject in itself. In the first place it is understood that the physician should accept the report of the Wassermann test as a supplementary aid in his diagnosis of the case in question. In other words, the results of the Wassermann test furnish one of the symptoms and in conjunction with the history and clinical condition must bear equal weight. The army laboratories use four symbols in designating results. Complete fixation being shown by double plus, almost complete fixation one plus, partial fixation plus minus and doubtful hemolysis minus. Craig recommends the use of only three terms, such as positive, doubtful and negative in reporting results of the Wassermann test. Other laboratories follow the rule of four plus, three plus, two plus, one plus and negative.

In the initial stage the weaker grades of reaction are of greater diagnostic value than in the late stages of the disease. As a general rule, it may be stated that in the primary stage a one plus reaction may be of some value, but it is not diagnostic unless taken several weeks after the appearance of the initial lesion. A double or three plus reaction is significant and in the average case should be regarded as a positive diagnosis especially if taken three or four weeks after the appearance of the initial lesion. The four plus reaction occurs in about 14% of cases of primary syphilis during the first week after the appearance of the initial lesion, in 20% during the second week, 41% during the third week, 53% during the fourth week and 61% during the fifth week. In the primary stage a negative reaction is of the least value. In the secondary stage of syphilis approximately 95% of all cases result positively. The four plus reaction in the secondary stage is regarded as a reliable diagnostic sign. A two or three plus reaction should confirm the presence of any clinical symptoms but should

not be regarded as diagnostic. In the tertiary stage the negative reaction is not of value in eliminating the possibility of the disease unless repeated tests result negatively and symptoms do not appear. As stated above in such cases the cerebrospinal fluid should be tested as well as the blood. In latent cases of syphilis it is generally conceded that about 30% yield negative results. In latent syphilis therefore, the one, two or three plus positive Wassermann test should be regarded as significant, especially if confirmatory evidence is obtained.

Ohlmaecher<sup>29</sup> voices the plea for a standard method of conducting the Wassermann test, including not only standard methods of technic but recognized symbols in rendering reports. Gradwohl<sup>30</sup> desires State Board regulations which would license technicians who engage in Wassermann work.

*Lange's Colloidal Gold Test.*—The value of the test in syphilis of the central nervous system is now quite universally recognized. The statement may be made that this test which Lange<sup>31</sup> described in 1913 affords one of the most important diagnostic aids in paresis. The reaction of the colloidal gold test is not fully understood. It apparently bears a distinct relation to the protein content of the cerebrospinal fluid.

In carrying out the technique of the test, which is a relatively simple procedure, great care must be exercised in the preparation of the solution. The chief difficulty depends upon the use of water which is not pure chemically. Absolutely pure water shows an H ion concentration of  $1.0 \times 10^{-7}$ . To approach this degree of purity the following procedure is necessary: Employ highly distilled water collected through tin lined receptacles. After adding to it  $\text{H}_2\text{SO}_4$  and  $\text{K}_2\text{Cr}_2\text{O}_7$ , distil into special glass container. Add barium hydroxide, distil and aspirate  $\text{CO}_2$  free air through the distillate. The H ion concentration will then be about  $1.4 \times 10^{-7}$ . The color reaction noted in reading the results of the colloidal gold test are classified as the "Paretic Curve," the "Luetie Zone Curve" and the "Meningitic Zone Curve."

*Globulin Determination of Cerebrospinal Fluid.*—The determination of the globulin content of the cerebrospinal fluid is of considerable value in the diagnosis of syphilis of the nervous system. The Noguchi butyric acid test is used

in the army and by the majority of serologists. A positive reaction does not necessarily indicate syphilis as there occurs a protein increase in the cerebrospinal fluid in other organic diseases of the central nervous system. The positive reaction confirms other laboratory and clinical findings. The negative reaction assists in eliminating suspected involvement of the central nervous system.

*The Precipitation Test.*—The Sachs-George<sup>32</sup> test consists of a precipitation resulting from the mixture of syphilitic serum and cholesterinized antigen. Hull and Faught<sup>33</sup> report a modification of the Sachs-Georgi precipitation test, consisting of either cholesterinized or non-cholesterinized antigen, the use of smaller volume, the centrifugalization and immediate reading of the tests. The authors state that in a series of 296 serums, 22 cases which resulted positively in the precipitation test and negatively in the Wassermann test all gave history of syphilis so far as could be ascertained. This work is interesting and needs further study and verification.

*Verne's Syphilitic Index.*—In 1917 Verne<sup>34</sup> precipitated the colloids of serum with ferric hydroxide. This was accomplished with different dilutions of serums and it was observed that in the case of syphilitic serums the necessary dilutions differed from those of normal or other serums.

Cornwall and Aronson<sup>35</sup> have reviewed the work of Verne in which they trace the successive steps leading up to the colorimetric method known as "Verne's phenomenon," by which it is claimed that a syphilitic index may be obtained which "constitutes a sero-measure of syphilis and indicates the efficacy of specific treatment." Verne's phenomenon is now being studied in the laboratories of Columbia University and the New York City Hospital.

#### SUMMARY.

1. Experimental syphilis in animals and the development of cultural methods are yielding results which are of fundamental importance in the study of the disease and its specific causative agent. These researches also may succeed in throwing light on some of the present obscure conditions pertaining to some of the specific infectious diseases of unknown etiology.

2. The culture method may be used to advantage in the diagnosis of atypical initial



lesions which do not disclose the spirocheta-pallida on dark field examination.

3. The results of recent experimental work show that the spirochete may spread, not only by continuity, but also by metastasis before the clinical diagnosis of initial syphilis is possible. This work needs corroboration before definite conclusions can be formed.

4. The early diagnosis of the initial stage is of extreme importance from the point of view of treatment and permanent cure. The diagnosis should be confirmed microscopically. For routine work the suction apparatus, or cupping tube provides a convenient means of securing clinical material. The use of the dark ground illuminator (dark field) is to be preferred to india ink smears or staining methods.

5. There are several factors influencing the Wassermann test which should be known by every physician. Serum from an alcoholic patient may result negatively; presence of undue bacterial contamination in a specimen of serum will cause the appearance of a positive test; the peculiar wide variation in the complement fixing power of the blood of certain patients may produce irregular results. Positive results may be obtained in cases of leprosy, hepatic disease, frambesia and scleroderma, or after the administration of an anesthetic.

6. The literature covering the technique of the Wassermann test is full of suggested changes, many of which mark developmental stages in the theory and *modus operandi* of the reaction. Much study has centered around the standardization of reactions and proper antigens for use in conducting the test.

7. It may be assumed that the employment of at least two antigens (cholesterinized and alcoholic extract) is important and essential for dependable results.

8. A Wassermann test upon the cerebrospinal fluid, in certain instances, is of great diagnostic value. The reaction is positive in the tertiary stage, even when no clinical manifestations of the central nervous system are present. A positive test upon the cerebrospinal fluid of secondary or primary cases indicates involvement of the central nervous system. No case of syphilis should be discharged as cured until after a negative 1 c. c. cerebrospinal fluid test has been demonstrated.

9. "The Provocative Wassermann" should

not be disregarded by the physician, but should be used in certain cases when considered necessary.

10. The Wassermann has its "limits of delicacy." When confronted with Wassermann variations the physician should consider the biologic nature of the reaction. Carefully controlled reports show confirmatory results in the majority of tests performed by careful technicians. There is need, however, for the adoption of a standard method and perhaps State Board regulations and requirements for technicians.

11. In the interpretation of the Wassermann test, the physician should bear in mind the following observations: In the initial stage of syphilis the weaker grades of reaction are of greater diagnostic value than in the late stages of the disease. The Wassermann test results positively in a relatively small percentage of cases up to the end of the second week after the appearance of the initial lesion. After the third week, fifty per cent or more of the cases will give positive reactions. A negative reaction is of the least value in the primary stage. In the secondary stage of syphilis, approximately 95% of all cases result positively; therefore in the secondary stage dependence should not be placed upon the results of one negative test. In latent syphilis a weekly positive reaction should be regarded as significant.

12. Lange's Colloidal Gold Test should be employed especially in cases of syphilis of the central nervous system. Physicians should make sure that the laboratory which carries out the test use extreme care in the preparation of the re-agents used. With the colloidal gold test the parietic curve may be distinguished from the luetic curve.

13. Globulin determination and cell count of the cerebrospinal fluid afford valuable confirmatory laboratory evidence in many cases.

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## THE INDICATIONS FOR X-RAY THERAPY IN TUBERCULOSIS\*

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Tuberculosis of the skin was one of the first diseases treated by x-rays. Such good results attended their use that this form of therapy soon became one of the recognized methods in combatting lupus of all types. At first, the application of x-rays as a curative measure was

wholly empirical owing to the fact that nothing was known of the biological action of this form of energy. This naturally stimulated research work all over the world, but the enormous amount of available clinical material in the continental cities accounts for the fact that many of the early experiments were carried out in European medical centers.

As was to be expected, these experiments were conducted along lines in harmony with the medical trend of the times. Two schools of thought developed, the one holding that the action of x-rays on diseased tissue is direct and that they inhibit growth and development in the same manner as the actual cautery or a chemical irritant; the other, insisting that the biological effects are the result of the production of immunizing substances due to the irritating action of the rays on cellular metabolism.

As our knowledge of the effects to be obtained by x-rays gradually evolved, certain well defined principles became established. One of these laid down by Holzknecht is as follows: "The metabolic processes of any given type of cell are increased in direct proportion to its susceptibility to the irritating effect of x-rays." Another law laid down by Schwarz stipulates that small doses of x-rays have a stimulating effect; large doses, a depressant effect on cellular activity.

Analyzing these two laws, it appears that the ideas set forth by both the schools of thought, above referred to, are partly correct. Furthermore, it becomes evident that in the application of x-rays to the treatment of disease, the manner in which favorable results are to be attained must constantly be held in mind. Whether the dose to be administered is to be intensive and hence have a direct, destructive action on the diseased tissue, or on the contrary, is to be small and stimulating in character, effecting a curative action in the same manner as a vaccine, is a question which ever confronts the radiologist, and while it is a fact that standardized methods of treatment are gradually being developed, yet it must be conceded that considerable chaos and difference of opinion still exist in the practical application of x-rays to the treatment of disease.

It is, however, quite generally agreed among radiologists that some types of disease require

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intensive irradiation in massive dosage, while others require small dosage repeated at rather frequent intervals. As an example of the former, basal celled epitheliomata is cited; of the latter, tuberculous peritonitis. In both instances it very positively can be stated that favorable results are obtained only in those types of cases in which the patient has a rather strong resistance to the disease. In short, the action of x-rays is that of a synergist and hence their administration in suitable cases becomes the deciding factor in helping nature to effect a cure.

Much of our knowledge of the technic necessary to produce desired effects under given conditions is the outgrowth of actual experience. The pioneers in x-ray therapy had nothing to guide them, and so our present fairly well standardized methods are due to the accumulated experiences of these men in the treatment of diseases in which no known therapy was productive of satisfactory results.

Two epochs mark our progress. The first extended to about the year 1910 and was largely limited to the treatment of superficial diseases, particularly of the skin. With the development of the high tension transformer, as used today, and the perfection of x-ray tubes, the treatment of deeper diseases became more and more practical. In unison with the development of these more efficient generating units, there gradually evolved a more scientific application of x-rays. Filters and crossfire methods of irradiation did much to standardize methods and very soon effected greater uniformity in the reported results.

During the first epoch referred to above, lupus was the only tuberculous lesion which responded favorably to x-ray therapy. Of the different forms of tuberculosis of the skin, lupus planus is the least responsive. The hypertrophic forms are not always curable, yet favorable results are to be expected in the majority of cases.

Some authorities recommend the use of resorcin in lupus vulgaris combined with irradiations. Still others advise an initial curettement of the affected area and subsequent x-raying. Kusnitzky of Neisser's clinic reports 700 cases treated in this manner with excellent results and without a single complication, such as the production of an acute miliary tuberculosis, or

the secondary infection of the internal organs with tubercle bacilli. Success in the treatment of lupus depends upon the intelligent use of hard x-rays. A review of the literature on the subject, shows that the percentage of favorable results gradually increased as radiologists devised suitable methods of filtration and utilized more penetrating x-rays having a more selective action on the diseased tissue.

The second epoch in the use of x-rays for therapeutic purposes was the outgrowth of the appreciation by progressive radiologists that favorable results in deep seated diseases could only be obtained by the use of hard x-rays. This accounts for the fact that cures were obtained only in superficial diseases during the first years, since only soft and medium hard x-rays were utilized. However, with the development of more efficient transformers of energy and especially the Coolidge tube, the use of penetrating irradiation became wholly practical and this led to the initiation of deep therapy as now practiced, and made possible the treatment of many tuberculous conditions other than lupus.

Even so, success in the treatment of bone tuberculosis with x-rays depends largely upon the thickness of the part treated. The small bones and joints which are surrounded by a minimum amount of soft tissue are more responsive to irradiation than those which are embedded in a large amount of muscle and fat. Hence it is that good results are reported in secondary tuberculosis of the small bones and joints, of the hands and feet. Moreover, closed tuberculous processes are more amenable to treatment than those in which a sinus or fistula are present. Primary tuberculous infection is regarded as a surgical disease and is not adapted to x-ray therapy.

Irradiation of tuberculous bone and joint disease in children is not contra-indicated, since no deleterious effects on the growth of the osseous structures have been noted. The prognosis in tuberculosis of the knee is regarded as bad. Kreeke reports a series of ten such cases treated without a single cure. To these the essayist can add a case treated in 1915 without the least evidence of improvement.

Tuberculous caries of the ribs responds well to irradiation. Oehler reports excellent results by irradiation in a large series of cases.

Among them, there were ten, which remained uncured after rib resection, that healed promptly when treated with x-rays. In summing up the reports from various sources, it is estimated that secondary tuberculosis of the small bones and joints can be cured by suitable x-ray irradiations in about 20 per cent of cases.

Tuberculosis of the larynx has been treated successfully by radiotherapy and the prognosis in this disease is favorable. The results reported in pulmonary tuberculosis vary greatly and appear to depend somewhat upon the enthusiasm of the radiologist as well as the technic of administering treatment. Massive doses are without doubt contra-indicated and certainly are not without danger, since they result in a rapid release of toxins which, upon absorption, produce secondary, deleterious effects. For this reason, small intensive doses, given at stated intervals, each does administered over a new portal of entry, are more suitable. The effect produced by this method of treatment is analogous to that which results from the administration of a vaccine.

To be sure, all types of pulmonary tuberculosis are not adapted to x-ray therapy. Only the foolhardy would attempt to arrest an advanced case with cavity formation and hope to stimulate the formation of cicatricial tissue, or would venture to treat miliary or acute progressive tuberculosis of any form. Subacute, incipient phthisis and those chronic cases in which there are well circumscribed areas of tuberculous inflammation, and no others, should be subjected to radio-therapy. Good results are reported as possible in the former and fair results in the latter if the treatments are carried out as above indicated.

Tuberculous peritonitis should be treated by the same technic as that described in phthisis. The prognosis in this disease is excellent if the liver, spleen and kidneys are not involved. Kreeke reports the cure of a case of ileocecal tuberculosis which had been verified by exploratory operation and in which resection, on account of the disseminated character of the disease, appeared impracticable. Spath speaks of a case of an orange size tumour of the adnexa, similarly verified as tuberculous and positively proved by histological examination, that was cured by eighteen x-ray treatments. No favorable results are recorded from

the use of x-ray therapy in tuberculosis of the genito-urinary tract.

Tuberculous adenitis, which in this country is generally regarded as a surgical disease, promises the highest percentage of cures by x-ray therapy of any tuberculous inflammation. During the years 1913 to 1918 inclusive, Dr. August Schonfeld of Vienna completed the treatment of 305 cases of tuberculous adenitis of the neck. Of these, he reports 196 as cured, 96 as greatly improved, and 13 as unimproved in spite of thorough and painstaking irradiation. Reduced to percentages, his results are as follows: cured 64.2% greatly improved 31.5%, unimproved 4.3%.

In conclusion, it may be stated that x-ray therapy is of distinct value in the treatment of tuberculous inflammations, and that its use in selected cases, in conjunction with other methods of proved value, is definitely indicated.

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#### THE ACQUISITION OF USELESS KNOWLEDGE\*

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When a dog has eaten well he lies down and sleeps. When a man has eaten well he sits down and smokes or stands up and talks. I have always greatly admired dogs. However, there is one good thing about the after dinner smoke. It is conducive to a philosophical frame of mind, and its philosophy is one of comfortable self-indulgence. I trust, therefore, you will bear with me if this evening I propose a philosophy of self-indulgence.

In speaking on the topic "The acquisition of useless knowledge," one might be expected to animadvert on the uselessness of some of the knowledge acquired in the university medical course, for there are some things in that course, premedical, medical, and clinical, which we all discover are not all that they were cracked up to be by the serried specialists who overloaded us with details concerning their specialties. But our error has been in assuming in the first place that these bits of really useless knowledge were useful. It is only our disappointment that hurts. Had we known

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from the start that some of these things were really but froth on the cup of efficiency, we would either have let them blow away unheeded or enjoyed them just for the iridescence of their hot-air filled bubbles. Then there would have been no disappointment. It is the disappointment that brings the bitter flavor. Useless knowledge to be thoroughly enjoyed must be frankly and unmistakably useless as one acquires it.

The week before last here at the University we had a most inspiring educational symposium. The relation of the University to the commonwealth was brilliantly discussed in many phases. For two days we listened to constructive criticism of our present methods and material of university education. A composite vision of better ways and broader functions of the University in training better and more serviceable citizens for the state was ably portrayed. It was all very convincingly said, and one could but nod his head in acquiescence. Yet when it was all over some of us had a slightly disturbed sense of a lacking note. Through it all, University faculty activity was emphasized and university student passivity assumed. The occasional student's inherent capacity for sturdy growth even under didactic teaching was not mentioned. I have an old gardener who, even in wet weather in the spring, unless watched, runs the hose every morning and every evening on his growing plants. Some of them are drowned, and at best when the weather is warm the rest grow up spindling and sappy. I excuse my gardener because he does love to run the hose, and besides he is only a patient out on parole from the State Hospital for the Insane.

The premedical and medical course as prescribed in Class A medical schools under the stimulation of the American Medical Association, is at present so thoroughly filled with ostensibly useful subjects to each of which are allotted exactly so many departmental hours that there is no time left for useless subjects. True, the bulletin states "Elective courses are offered in the fourth, fifth, and sixth years. These are listed under Departmental Statements." But when one turns to the "Departmental Statements," one finds the elective courses are all intensely useful and all accurately measured out by the semester hour. In fact,

from the time the medical student leaves the High School until he begins the practice of medicine all his work is arranged on a strictly clockwork schedule of ostensibly useful studies. This is, no doubt, as it should be. And, do not misunderstand me! I hasten to disclaim any desire to suggest the scheduled requirement of any useless subject. On the contrary, I suspect that the requirements even in our most useful courses are altogether overdone. In meeting these requirements the faculty is apparently attempting to ladle out heaping measure and the students struggling to withstand the overdose. The result is a skillful but overworked faculty and a student body equally skillful in meeting the hour requirements by the scant fraction of a minute. The addition of new courses even in the most seductive of useless subjects would only result in greater skill in the doubtful qualifications so eminently possessed by both faculty and students. These carefully prescribed courses somehow remind one of those held in North Dakota every fall for greyhounds coursing jackrabbits,—the greyhound is the swifter, but the jackrabbit is usually the more artful dodger.

And perhaps, after all, the product of such a system of education as the present is the most desirable. It may be that in a republic efficiency of the individual as a unit in the state is not only the greatest but the only consideration. The old Greek philosopher's dictum that the individual should spend one-third of his life in training, one-third in his personal enjoyment, and one-third in the service of the state is perhaps not applicable to modern conditions. Certainly the order in which he placed the thirds is not the order of today. The medical student spends the first third of his life in learning, and a little more than the second third in the service of humanity. The weak point in our present time apportionment lies in the fact that after two-thirds are gone, there still remains another third at the end of life for which frequently no preparation has been made. Thus, the man who knows only the science and art of his own profession and ostensibly entirely abandons interest in both when he retires from practice is a sadly misplaced unit in the community. His service to the state is over but he yet lives. Without internal resources of his own and without the means of

becoming in harmony with his environment other than by way of his useful but, withal, narrow life service he is psychologically distraught. He is apt to commit agriculture, California, or suicide. Sometimes even at this late date he attempts to interest himself in the acquisition of useless knowledge, but it is usually difficult to become interested in postage stamp collections after one is sixty, unless the germ was planted at a more impressionable period. Indeed, the retired professional man who has no hobby, no perfectly useless bit of knowledge with which he may play, is apparently a fit subject for merciful euthanasia.

But even the busy doctor must relax before the last third of his life. Few minds are capable of keeping up continuously the speed at which the educated physician of today must work in the service of the community. There are, and of right ought to be, frequent periods of relaxation. Usually these are spent, and of right ought to be spent, in physical pleasures. For example, in the medical profession are probably more enthusiastic hunters than in any other profession. But, hunting comes for short periods only, and with the gradually increasing restrictions of our game laws these periods are becoming shorter and shorter. The fishing season still remains fairly long, but the length of unwarrantable fish is getting longer. Golf in the north with six months of winter and three months late spring, can claim attention for but a short period. The total length of the closed season on game, fish, golf balls, and even medical society meetings is more than half the year, and one cannot always choose the other half when necessity for relaxation is forced upon one. How desirable at these times is the pursuit of some form of perfectly useless bookbourn knowledge, which by its very uselessness gives the desired relaxation. Dr. Osler, that beloved master of medicine, even in his most active years, spent his hours of relaxation in reading things wholly unrelated to medicine, and much of his charm, as well as his personal pleasure, came from his knowledge of things not medical.

Even in the crowded years of a University medical course, there are times when one grows weary of prescribed science and needs to turn to something which will rest the mind without stultifying it. Thus, there come hours between

the setting and the rising of the sun when the companionship of good books on perfectly useless subjects may be profitably sought even during a University course. It would be interesting to know the annual circulation of such books from our University library. The usual story is that the medical student has no time for such reading. Pardon me, but I believe he could profitably make the time. Yes, I believe it is possible even in our efficient University for the student to obtain for himself some degree of self-culture despite the flood of teaching with which he is deluged.

But suppose the time taken for the acquisition of useless knowledge does subtract somewhat from the time necessary for the acquisition of useful knowledge, does it necessarily impair the efficiency of the professional man in his duties to the state and to humanity at large? It the state necessarily the worse off? In the world war Germany, that boastedly most scientific and most efficient nation, the one that had learned to utilize in the highest degree the greatest variety of human knowledge, showed that in the process she had not only lost her soul and her honor, but also, even for her own selfish purposes, her ability to interpret the thoughts or foretell the psychologic reactions of other peoples. And now her efficiency has gone from her along with her happiness. She has returned again to a middle age struggle to carry on her merely vegetative functions. She tends to despondency and suicide. The nation that encourages the philosopher, the poet, and the artist will live longer than the one which neglects these and founds its future only on science. Nations, like men, "cannot live by bread alone."

What are the subjects of useless knowledge in which one may luxuriously indulge one's self not by taking University courses but by leisure reading and study? One hesitates to mention any of them in the presence of their devotees who would immediately rise and claim for them paramount useful applications. But as the humble learner seeks things out for himself, he usually will not go far enough to find the blight of usefulness in astronomy, in geology, in paleontology, in anthropology, in archeology, or in history. Yet each of these subjects, if taken in moderation, gives a man a more perfect orientation of himself in the uni-



verse and makes him less sensitive to the petty disappointments of his own or other's abortive attempts at remaking the world in a day. They all teach patience. The record of the slow grinding of the mills of the gods in the making of the universe, in producing a habitable world, in populating it with evolving types of animals, in distributing races of mankind, and in the development of the arts and sciences and of various social states, is a field of study in which it is delightful to wander. And all the subjects in this field have the additional desirable qualification of offering little temptation to a man having a mere speaking acquaintance with them to show off his modicum of knowledge and to make it pass for profound learning. This is one of the most important points to be considered in the acquisition of useless knowledge for its own sake. The moment one acquires sufficient familiarity with a subject to speak of it learnedly to strangers, the subject has lost its charm of uselessness since it has become useful to the possessor as a means of publicity. The truest test of personal enjoyableness of useless knowledge is its flavor in solitude. Talk of it much, and it becomes like that chastity which has been successfully proven by legal process.

The appreciation of music, of poetry, of painting, of sculpture, and of art in general are all most delightfully useless accomplishments. True, the appreciation of music in its more strenuous forms is open to the possibility of being useful as a means of public aggrandizement. Not everyone who pays \$10.00 each for grand opera tickets is doing it solely for the love of music. The dress in which grand opera is usually heard is evidence of the usefulness of music as a medium of publicity. But the study of grand opera from the gallery or by one's own fireside with the common garden variety of phonograph is not readily interpretable as a means of seeking social distinction. The perusal of Shelley's "Cloud" will not make one a neighborhood wonder as a weather prognosticator, but it may give him hours of enjoyment even in times of serious illness. The Art Institute in Chicago and the Metropolitan Museum in New York give more opportunities for the enjoyment of art than the west side of Michigan avenue, or Broadway at 42nd Street, though one's presence there is

not so useful as a means of ostentation. Parenthetically it is a bit too bad that one is apt to find in the Innis room in the Art Institute on any free admission day more foreign-born than American-born citizens, and that the gold and the jade ornaments in the Metropolitan Museum in New York attract more youthful American visitors than does the Rembrandt room. I am wondering how many here are familiar with the great mural paintings in the Capitol in St. Paul or with the best things in the Art Institute and the Walker Art Galleries here in Minneapolis. Have we all seen those perfectly useless but wonderfully artistic creations, the animal groups in the Biology building, only a stone's throw from the medical buildings on this campus.

One of the speakers at the Educational symposium two weeks ago stated that in times past the opinion of the physician in matters of religion was apt to carry as much weight as that of the parish minister. Today it is feared that the physician has little interest in religion either as a mode of fire insurance or as a psychological phenomenon. He is apt to think that his scientific training has neutralized his Sunday school teaching, while his literary studies, if any, have omitted any adequate consideration of the historical development of religion, that factor which has controlled the policies and movements of men and nations for centuries. It is suggested that however little or great his professed religion, the intellectual man may find that a speaking acquaintance with the historical development of the religious concept as it has grown up from demonology is one of the most interesting bits of time-consuming information in which he may indulge himself.

-Without wearying you further, permit me to sum up what I have said by urging upon you as young men and young women the desirability of finding time, despite your multiferious duties in preparing yourselves as citizens efficient in the service of humanity, to devote some time also to the acquisition of useless knowledge purely for the enjoyment you may find in it. This enjoyment will come mostly in the little hours in between, in the days of rest, in the days of relaxation enforced by sickness, by overwork, by age. It will give some mental association with Plato, with Marcus Aurelius,

with Emerson. It will help make life worth living when nothing else seems worth while. The saying of Roger Bacon is still true, "Learning maketh a man fit company for himself."

## PLASTIC SURGERY OF THE EYELIDS AND ORBIT.\*

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Of the many advances in surgery developing out of the late world war, that of plastic surgery of the face has been marked and of general interest. Though at first poorly organized, this special branch of war surgery gradually became more and more highly specialized. Centers were established for the plastic and osteo-plastic treatment of facial injuries including burns, thereby affording unique opportunities for study and concentration of effort in the restorative treatment of the marked facial deformities so frequently met. To those who were engaged in this work, its uninterrupted progress and increasing possibilities were a source of gratification and stimulation to greater efforts on behalf of the many patients who were entitled to return to useful civil life without becoming objects of pity.

During the earlier periods of this work, more attention was paid to the repair and restoration of the larger facial defects, particularly those of the lips, cheeks and lower face. Many of the wounds of the upper face, including extensive injury to or loss of the eyelids, conjunctival sac, orbital margins, malar bone, etc., were treated by a plastic skin closure of the defects without restoring contour and recourse was made to the wearing of artificial facial masks attached to spectacle frames. Such artificial restorations were constructed by Captain Durwent Wood of London, England, by Captain Walter Duff of the Canadian Medical Corps and by many members of the dental corps of the Canadian and American forces. Many of these masks present a very good appearance but changes in the underlying tissues necessitate frequent readjustments and their upkeep and repairs constitute a problem of considerable difficulty of solution.

In 1918 and 1919, greater opportunities enabled the surgeons to make a more careful study of the surgical restoration of the eyelids and orbit and the results obtained have more than justified the attempts made to restore the normal contour and appearance of the parts and to make possible the wearing of artificial eyes. It may be now safely stated that it was but rarely necessary for patients to wear artificial masks except as a temporary expedient during the intervals between plastic operations.

In the surgical restoration of the eyelids, many of the well known pedunculated flaps (Dieffenbach, Fricke, Von Langenbeek, Tripiet, etc.) have been used with good effect, but in a large number of patients with extensive injuries or missing eyelids, considerable modification of these flaps with regard to their size, shape and thickness became necessary.

*The Restoration of Contour.*—One of the great problems is that of restoration of contour insofar as the orbital margins and malar region are concerned. For this purpose, two well established methods are available after the skin and subcutaneous tissues have been restored sufficiently by preliminary operation. I feel that it is inadvisable in the average case to attempt both the skin restoration and the contour restoration (the correction of marked depression) in one operation.

The first method, that of implantation of costal cartilage (autogenous or homogenous) has a more universal application. Staige Davis has shown experimentally that implanted cartilage lives and maintains its exact shape and except for a very slight rounding of any sharp edges that may have been present at the time of its implantation. Our clinical post operative observations confirm these findings. The cartilage should therefore be trimmed to the desirable shape and size and carefully fitted to place before being held in position by suturing the overlying subcutaneous tissues and skin.

The resistance of cartilage to infection is well known and for this reason its use for transplantation is greatly to be preferred to bone grafts in the surgical restoration of contour of the upper parts of the face. In order to obtain the maximum of rigidity where desirable, one should place or wedge the cartilage in close contact with the underlying periosteum in order to ensure a firm, fibrous union.

\*Candidate's thesis, presented before the Minnesota Academy of Ophthalmology and Oto-laryngology, February 26, 1921.



The second method is the transposition of the anterior portion of the temporal muscle to the region of depression. If necessary, the anterior two-thirds of the muscle may be dissected free from the temporal fossa and its fibers separated from the remaining posterior portion as far down as its coronoid insertion. When carefully done, its nerve supply is largely preserved, thus preventing atrophy and fibrosis of the transplanted muscle. This portion of the muscle may then be swung forward on its coronoid pedicle and sewn in position in the malar region or in the infraorbital region, sometimes as far forward as the inner canthus. This method is chiefly of service in cases where there is loss of the malar portion of the zygomatic arch. This permits transposition of the muscle without undue twisting or constriction of its pedicle. The muscle is obtained by means of a vertical incision extending upwards from the zygoma and situated about 1 cm. anterior to the ear and within the hair line to avoid scarring. This method of facial contour restoration was introduced by Major Gillies, officer in charge of the British Section of the Queens Hospital, Sidcup. I have used it in many cases and find it of great service. In some of the more extensive cases, this method did not completely restore contour, but provided a sufficient connective tissue bed for the introduction of costal cartilage, the implantation of which otherwise would have been impracticable.

Large depressions may also be filled by using "tubed" pedical flaps from the neck or upper chest in three-stage operations.

*Eyelid Operations For Facial Paralysis.*—Thin strips of cartilage have been inserted beneath the margins of reconstructed eyelids and have been of decided value in improving the appearance and in maintaining artificial eyes in position. Major Gillies, used this method with fair success in several cases of complete eyelid paralysis where the peripheral facial nerve injury was so extensive that recovery by spinal accessory or hypoglossal anastomosis would be impossible. In some cases attempt was made to obtain a spring-like action by shaping the cartilage like a bow.

In one case of complete peripheral facial paralysis I used a modification of the temporal muscle method by transplanting a very narrow

strip of temporal muscle and fascia completely encircling the palpebral fissure through small tunnels made in both eyelids close to the tarsal plates. This gave the patient greater protection and comfort by diminishing the vertical diameter of the palpebral fissure and in addition markedly improved the appearance of the eye. The effect, however, seemed to be entirely mechanical for no action of the transplanted muscle could be demonstrated.

In many cases of facial paralysis tarsorrhaphy resulted in considerable improvement in appearance and afforded greater comfort to the patient. The lash-bearing area of the lower lid for a distance of some three or four mms. internally from the external canthus is completely excised. A corresponding amount of tissue is removed from the conjunctival side of the upper lid margin without encroaching upon the upper lashes. The two raw areas are sutured firmly in apposition with interrupted fine silk.

*Cartilage Transplantation Into Tenons Capsule.*—This operation has been performed in a large number of cases for the purpose of correcting the sunken-in appearance of the artificial eye and to give the same better movement. The results have been most encouraging from a cosmetic standpoint. Autogenous cartilage is preferable and it is necessary to take the entire thickness of the costal cartilage in order to obtain a sufficient amount. Many different shapes of cartilage have been inserted varying from that of a sphere made of one or two pieces to a ball and cone arrangement<sup>2</sup>. I have found an egg-shaped piece of cartilage most suitable. The technique of the preparation of the bed for the cartilage is as follows:

A horizontal incision about 1.5 cm. in length is made through the middle of the posterior wall of the conjunctival sac and Tenons capsule is opened and enlarged sufficiently to hold a piece of cartilage about 1.8 cm. in length by 1.2 cm. in diameter at its anterior end. In order to prevent undue tension of the conjunctiva over the cartilage it is advisable to undercut above and below sufficiently to permit slight eversion of the margins of the incision which are then firmly closed by mattress sutures of fine catgut. Failure to do this has resulted in the exposure of a small area of cartilage in several of our cases. In these the

cartilage has invariably become covered over by granulations in three or four weeks time without affecting the ultimate results. In this regard, cartilage is much superior to the hollow spheres of glass or metal used in the Mules' operation which if uncovered are usually extruded. The appearance and movement of the artificial eye over a cartilage transplantation frequently simulates the normal to such a degree that it escapes detection. In this operation the chief problem is to determine and insert a piece of cartilage of the correct shape and size in order to insure the relief of the sunken-in appearance of the artificial eye and obtain the maximum range of movement.

*Skin Grafting in Surgery of the Eyelids and Conjunctival Sac.*—Probably the most outstanding advance in plastic surgery developed in the late war is that of the epidermic inlay (skin graft inlay) introduced by J. F. Esser, of Holland. A full description of this method is published in the *Annals of Surgery*, March, 1917. The essential features of the technique described by Esser are as follows: Dental impression compound (Stents manufacture preferred) is sterilized by boiling and in its softened state is used for the purpose of making an exact mold or impression of the surface or cavity to be skin grafted. A thin, Thiersch graft is then cut and wrapped around the mold with the skin surface in contact with the mold. Esser states that the Thiersch graft must be everywhere the same thickness and equally stretched upon the impression mold. The whole is then inserted into the previously prepared cavity and the graft is held in firm contact with the tissues by suturing the margins of the wound over the graft-covered mold.

*The Surgical Enlargement of the Conjunctival Sac.*—Adhesions and losses of portions of the conjunctival sac are of frequent occurrence in war injuries of the eyes and as scar tissue contraction increases the maintenance in position of an artificial eye becomes more and more difficult. For these conditions, Esser has devised a method of enlarging the conjunctival sac by means of a buried skin graft. His technique is as follows:

An incision is made through the eyelid skin parallel to the palpebral fissure and extending laterally according to the extent of the conjunctival deficiency. The tissues are then

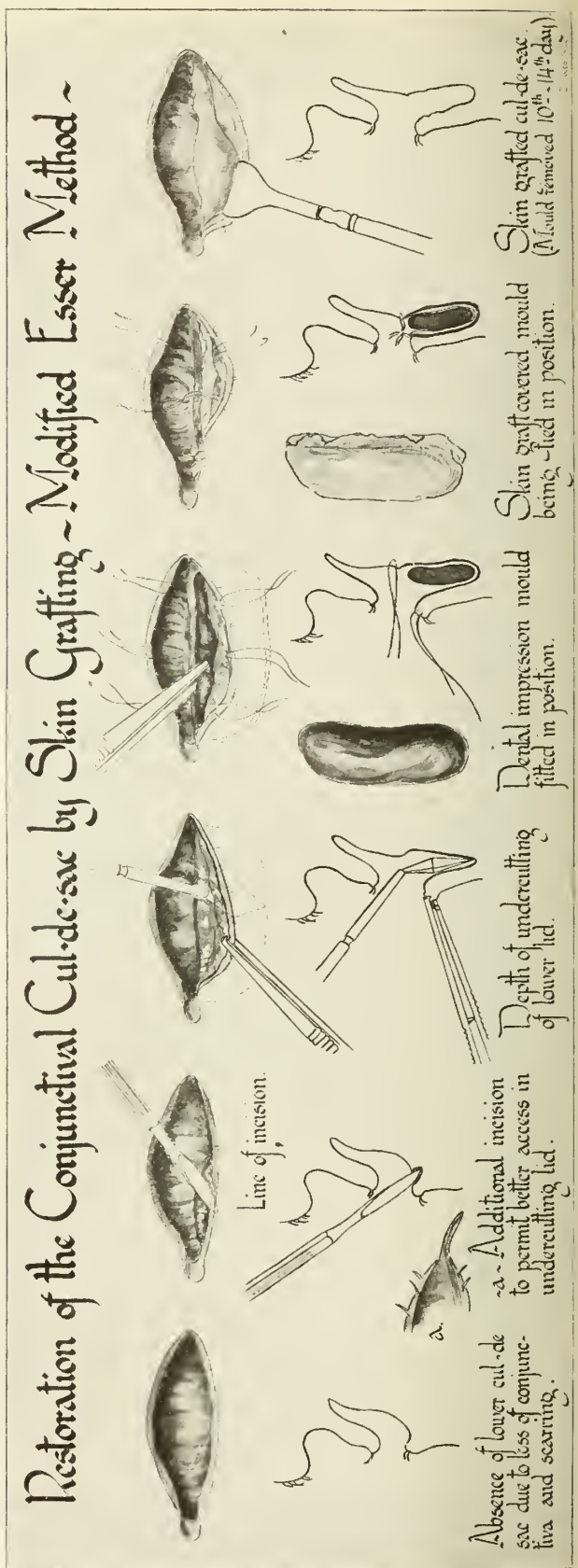


Fig. 1. The author's modification of Esser's method of restoring the conjunctival sac.



undercut as close to the conjunctival sac as possible without perforating into the same, and an impression of the cavity thus formed is taken with dental impression compound sterilized by boiling. This mould is then trimmed until the margins of the incision may be brought together over it without undue tension. A thin Thiersch graft is then cut from the inner surface of the upper arm and wrapped around the mould. The whole is inserted into the cavity and the margins of the incision carefully sutured together. In two weeks' time an incision is made through the conjunctiva overlying the mould, which is then removed and the epithelialized fornix thus formed is maintained by a temporary prosthetic shell until an artificial eye may be fitted. This method was used with success by the surgeons of the Queen's Hospital. I have modified the technique described by Esser in that the incision is made at the desired point in the conjunctival sac instead of through the eyelid skin. The tissues are then undercut until a cavity somewhat larger than the desired enlargement of the sac is obtained. The impression compound mould is then made, covered by the skin graft and buried in the usual manner by suturing together the cut margins of the conjunctiva. In many cases it may be found somewhat difficult to make the incision close to the Tarsus and accomplish the desired undercutting, fitting and insertion of the mould, etc. In restoring the inferior sac this difficulty can be readily overcome by making an incision outwards and slightly downwards for a distance of 1 cm. from the external canthus. (Figs. 1, 2.) This will permit eversion of the lid and will render the operative field quite accessible. This modification has the following advantages:

1. Unnecessary scarring of the eyelids is prevented and the normal elasticity of the skin is not impaired. As it is not uncommon to have an accumulation of serum develop around the buried graft, sutures may give way and slight infection may take place without impairing the success of the graft. These minor complications, however, in the case of inlays buried through an incision in the eyelid skin may lead to granulations and scarring, and in rare instances epithelialized fistulae have developed necessitating operative excision and closure.

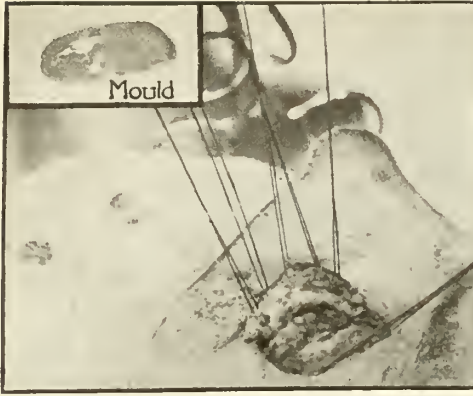
2. The exact position, depth and width of the new fornix may be better outlined by an

initial incision through the conjunctiva than by undercutting from the skin side to a point just beneath the surface of the conjunctiva. In our experiences, the incision may also be made closer to the tarsal plate by operating through the conjunctiva.

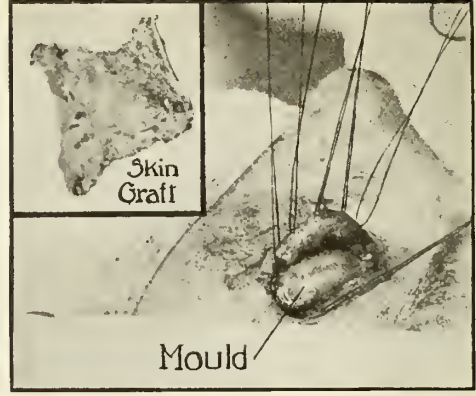
3. The depth and direction of the cavity can be readily determined according to the necessity of the individual case and the graft covered mould more readily maintained in the desired position. A diagrammatic chart of this method is shown in Fig. 1, and actual photographs of the operation in Fig. 2. Fig. 3 shows a restoration of the lower conjunctival sac.

*The Surgical Restoration of the Eyelids by Skin Grafting.*—The Esser method of skin grafting may be variously modified for the treatment of cutaneous deficiencies of the eyelids resulting from wounds or burns. In these cases there is usually present a varying degree of ectropion of the upper or lower lids. There may be difficulty experienced in closing the eye, and in the burn cases the inner canthus is often drawn forward 3 or 4 mms. by the contraction of the skin over the bridge of the nose.

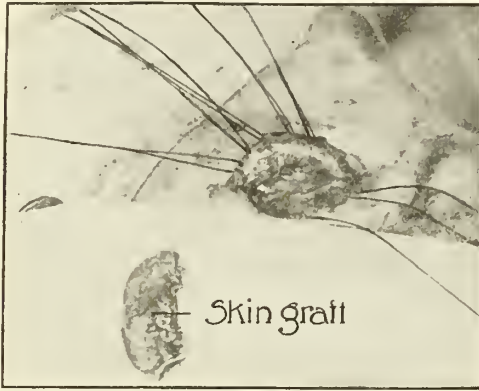
Two modifications of the Esser process have been made by Major H. D. Gillies of the Queen's Hospital. The first method may be conveniently termed an *Outlay* in that the graft covered mould is buried in the subcutaneous tissues of the eyelid through an incision in the skin and is removed through the same incision. The skin grafted cavity thus produced is laid open and forms a skin covering to the eyelid. The increase of the eyelid skin corresponds to the extent of the grafted area. In burn cases it is usually necessary to increase the skin covering more particularly in a vertical direction. As a general rule the undercutting is continued until the lid margins may be readily drawn past their normal position when the eyes are closed. The position of the incision and the extent of the undercutting varies with the individual case according to the degree and position of ectropion, scars, etc. The incision is usually horizontal, following closely the margin of the tarsus and frequently extends from canthus to canthus. In the undercutting and shaping of the mould, attempt is made to make the surfaces rounded and to avoid sharp angles and pockets. The mould is fashioned of sufficient length, size and shape to permit the margins



Lower conjunctival sac reproduced by undercutting; mould of cavity thus formed.



Dental impression compound mould fitted in position.



Sutures retracting margins of incision. Skin graft wrapped around mould.



Mould and skin graft being buried in position by tying sutures.

Fig. 2. Photographs of the actual operation for enlarging the conjunctival sac of patient shown in Fig. 3.

of the incision to be drawn together over it with slight tension. The mould is then covered with a Thiersch graft and held in place by uniting the margins of the incision. It is not uncommon to have a collection of serous exudate appear in four or five days, or the sutures may give way and the dental compound come away within a week or ten days after insertion. These complications have not in our experience had any deleterious effect upon the Thiersch graft. It is particularly important in these outlay grafts that the Thiersch be cut in one piece and as uniformly even and as thin as possible. The thicker grafts do not give the same elasticity to the eyelid and variations in thickness are noticeable for some time. It is also important to have the graft approach as nearly as possible to the cut margins of the incision. The position of the incisions and extent of undercutting will, of course, vary in the localized eyelid deformities resulting from

scar contraction according to the amount, position and direction of the skin to be replaced. Figs. 4, 5 and 7.

The second method may be termed, *The Epithelial Overlay*. This differs from the *Outlay* method in that the mould is not fitted in such a way that it may be buried and the margins of the incision brought over it, but is applied and fitted over the entire raw area. The skin graft is therefore applied to its under surface only and not wrapped around it as in the case of outlay grafting. The mould is then held firmly in position by sutures passing over it from the margins of the incision. This overlay method is more universally applicable to eyelid skin deficiencies than is the outlay method. Post operative discomfort is less, pocketing of the ends of the grafted area is rare and the early and later cosmetic and functional results seem to be better. Latterly, I resorted to the Overlay method in most cases with extensive or





Fig. 3. The inferior conjunctival sac restored by skin grafting according to the method shown in Figs. 1 and 2.

localized eyelid skin deficiencies. It is also of great service in the more extensive injuries of the lids which are accompanied by loss of tissue, displacement and adhesions. In these cases extensive undercutting may be necessary before the remains of the eyelid can be brought



Fig. 4. *The Outlay* method of eyelid restoration ten days after operation on all four lids. The dental compound moulds are beginning to extrude. Final results shown in Fig. 5.

to the normal position. Consequently the covering in of a graft-covered mould by the *Outlay* method would be impossible. The remains of the eyelid may then be sewn in a favorable position, scars excised and an impression taken of the entire raw area: A Thiersch graft is then applied to the raw area and held firmly in place by means of the compound impression. The mould is held in position by suturing, adhesive strapping or bandaging and is left undisturbed for ten or twelve days. The overlay method is also very useful in displacements about the inner canthus where, if an outlay be used, there is some difficulty in eradicating the hollow produced. After the scar tissue is removed and bands and adhesions are divided permitting the lids and canthus to resume a normal level and position, the parts are pressed firmly to position by means of impression compound, the under surface of which is covered

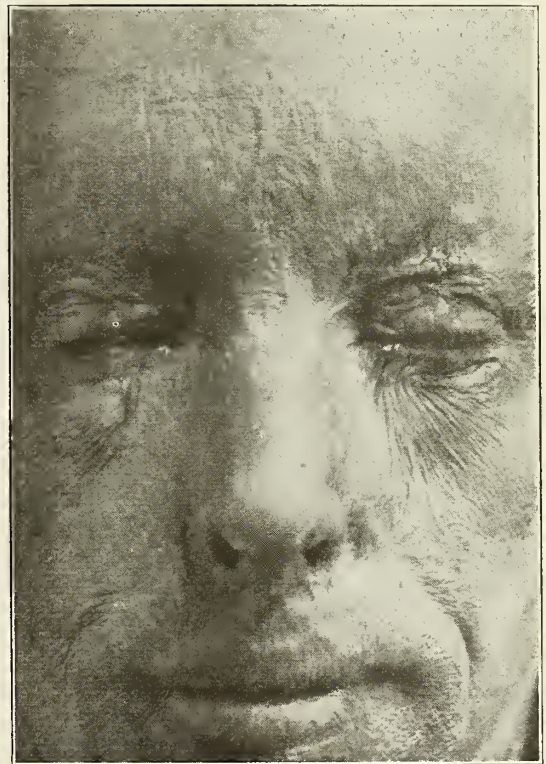


Fig. 5. Restoration of the eyelid skin of all four lids by the *Outlay* method of skin grafting. In this case the maximum increase in cutaneous surface was as follows:

|                         | Horizontal | Vertical |
|-------------------------|------------|----------|
| Right upper eyelid..... | 2.5 cms.   | 1.2 cms. |
| Right lower eyelid..... | 2.4 cms.   | 1.2 cms. |
| Left upper eyelid.....  | 2.5 cms.   | 1.0 cms. |
| Left lower eyelid.....  | 3.1 cms.   | 1.8 cms. |

by graft to the necessary extent. By this procedure the employment of pedunculated flaps



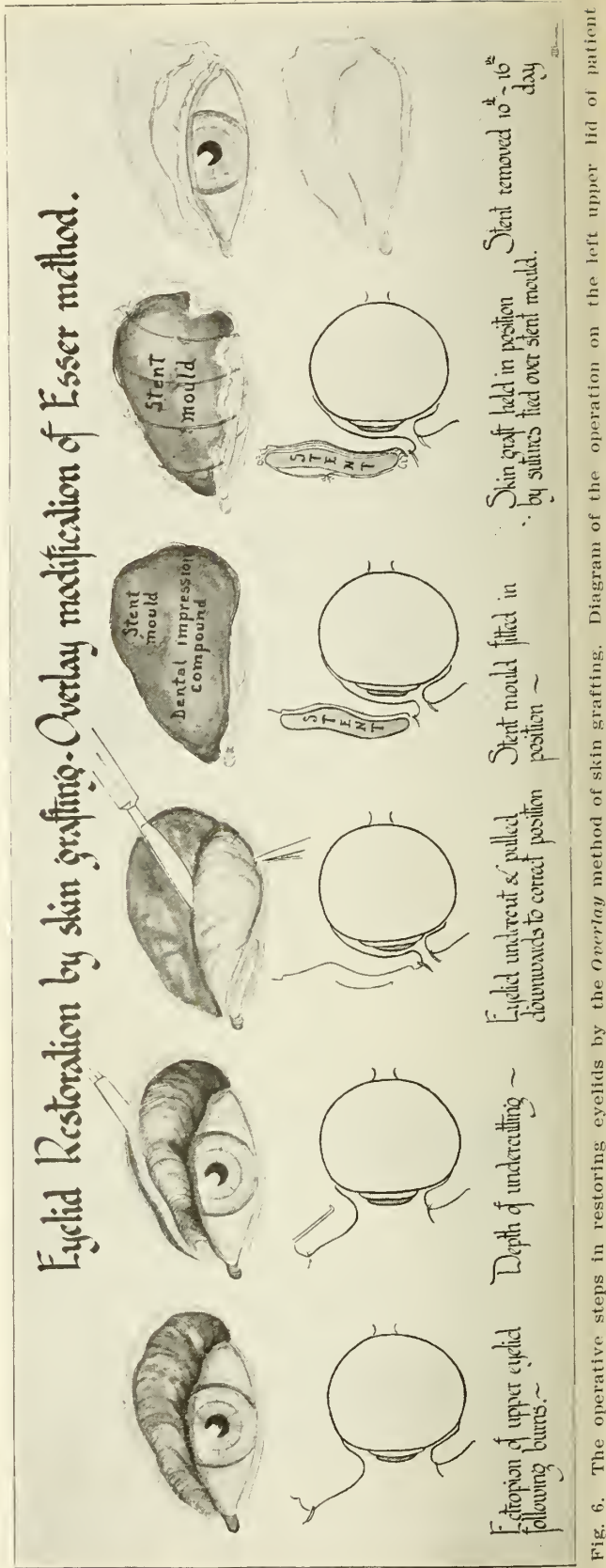
Fig. 7. Marked ectropion of all four eyelids following burns. The right upper and left lower lids have been incompletely restored by the *Outlay* method.

may be avoided in many cases, (Figs. 6, 7 and 8.)



Figs. 8 and 9. Final result of case shown in Fig. 6. Carried to completion by the *Overlay* method. Even larger areas of eyelid skin were restored in this patient than in patient shown in Figs. 4 and 5. Function completely restored.

One rule cannot be too strongly emphasized





and that is, *Patience Must be the Watchword of the Plastic Surgeon*. Many failures have resulted from operating at too early a date after the initial injury and from over anxiety and haste in performing subsequent operations before sufficient time has elapsed. By so doing the tissues are not given a fair chance to recover their blood supply, overcome any infection present and become soft and elastic. As a general rule, three months should elapse after a wound has become healed over before plastic operative procedures are undertaken and a similar interval of time should be allowed to pass between operations. Corneal involvements or other complications particularly in burn cases with ectropion may, however, necessitate earlier and more frequent operative interference. It has been noticed that skin grafts of the eyelids in burn cases take better, look better and show less reaction following operation when the surgeon has waited many months until the marked hyperemia present in the early stages has more or less disappeared. It can be truly stated, "More haste, less speed." War experience furnished these lessons aplenty, and we should study and apply them to plastic surgery in civil practice.

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## THE USE OF SPLINTS IN SPINE INJURIES\*

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The treatment of spine injuries of all grades of severity is usually poorly done. There is a great deal of prolonged and permanent disability due to spine injuries which should have been relieved almost at once if patients were treated by ideal rest. The responsibility for this disability rests almost

entirely upon the surgeon or physician who sees the patients at first.

The writer desires to call attention to certain measures which have been found to be curative in many cases and very helpful in others. One must remember that spine injuries cause disability in one of three ways: first, strain; second, fractures; third, infection and inflammation following one or both of the preceding.

Occasional theoretical excursions to the contrary, notwithstanding, the indication in all these cases is for rest. Crimes are being committed daily in the name of massage, manipulations "adjustments" and exercise.

Inefficient treatment often rests upon the fact that a patient with a spine injury is said to have been put at rest if he is sent to bed. This indicates a very inadequate conception of the meaning of rest such as is required for an injured bone or joint. The kind of rest required is that which may be secured only by the perfect fixation of all parts adjacent to a spine injury. Movements of the injured or strained parts must be reduced to a minimum.

When the injury is in the upper-dorsal or cervical region, fixation of the trunk with the head included is necessary. If the injury is in the lumbar or lumbosacral region, fixation of the lower extremities with the trunk will be required. This may raise the question which almost always comes up, whether fixation of an injured joint may contribute to stiffness or ankylosis. This question has been agitated again by the teachings of Willens as to the treatment of injuries of suppurating joints.

The moving of injured knees may have done good in a few cases. It has done harm in a great many. My own treatment for the spine and other bone and joint conditions rests upon the premise that stiffness and ankylosis depend upon one thing only and that is pathology—and that pathology is minimized by rest. The same rules should be applied to spine injuries that apply in all other fractures and injuries to joints. The injured parts should be restored as nearly as possible to normal position, under anesthetic usually, and then a fixation device should be put on which will absolutely protect the parts against movement.

This fixation device should, in the trunk, be left on for from six to twelve weeks. In fractures of the bone without injury to the cord good results

\*Read before the Southern Minnesota Medical Assn., Mankato, November, 1920.

may regularly be obtained in this way. Otherwise disability is quite likely to be prolonged. The same rules apply with even greater force in fractures with damage to the cord.

We may have a complication presented along with the spine fracture comparable to a peripheral nerve injury. There arise in these cases, questions of partial paralysis and contracture deformity as muscle power returns. There are often nutritional or trophic disturbances. In the latter class of cases replacement of injured parts and fixation are necessary at once. The patient can be managed much better in an adequate splint. In addition thigh adduction, knee flexion and foot drop must all be prevented or corrected.

There are only two devices that I know of that are adequate to meet this situation. These are the double abduction Thomas splint and plaster paris. My own preferences is for the latter. Plaster paris can be used either as a complete cast or as a plaster bed.

Four recent cases in adults past thirty in private practice and about five or six in my military service have impressed me with the fact that neglected spine injuries often lead to a destructive osteo-arthritis. This is a condition which was thoroughly discussed by Dr. Gillette of St. Paul almost twenty years ago.

These are usually tuberculous lesions of the vertebrae. Rather commonly also after traumas we have symptoms of chronic arthritis due to strain or other infectious forms of osteo-arthritis. It is my belief that not only about 90 per cent of the tuberculous lesions but almost all other spine disability might be prevented by the immediate application of a plaster jacket or an efficient spine brace.

#### CONCLUSIONS

First—Bone and joint injuries to the spine call for immediate adequate immobilization of the injured parts.

Second—The period of immobilization must be somewhat longer than for similar injuries in the extremities.

Third—During the time the patient is in bed a Bradford frame; a double Thomas abduction splint or plaster paris should be worn.

Fourth—For a continuation of treatment a plaster paris jacket or a Ridlon or Taylor spine brace may be used.

Fifth—Much disability and even more serious consequences will be prevented in this way.

#### DISCUSSION

DR. EMIL S. GEIST, Minneapolis: The subject of fracture of the spine as presented by the essayist is a very important one. Dr. Orr did not emphasize, but I should like to do so, that fracture of the spine without paralysis is not an uncommon thing to see. The more we study cases of injury to the spine, either direct or indirect injury, the more we realize that fracture of the spine without paralysis is frequent—comparatively frequent at least. For instance, during the three weeks of last month I saw three cases. I saw in Chicago a few days ago three x-ray plates brought to Potter's laboratory within the last twenty-four hours, all of them cases of fracture of the spine without paralysis. This type of case causes painful spine for a long time afterward and is the cause of a great deal of disability. The recognition of this is especially important, in industrial work. A lot of the disability is due to the fact that these cases are not diagnosed and are not treated by adequate fixation as Dr. Orr has outlined. In other words, these cases ought to be properly diagnosed by the x-ray and properly treated at the time of the injury. Lateral x-ray pictures are frequently not made, and it has been my experience that as a result of this neglect many cases are overlooked. If these cases are not properly treated, and often even in spite of the best treatment, many of them will continue to be painful and present painful symptoms.

These old painful cases are candidates for a fixation operation. We have done that in a considerable number of such cases.

DR. H. W. MEYERDING, Rochester: I know that we all appreciate Dr. Orr coming here and giving us this splendid paper, and we are greatly indebted to him for the excellent slides he has shown.

I agree with Dr. Geist that it is the orthopedist who sees and receives cases of fracture of the spine without nerve injury. Some neurologists believe that it is rare to have fracture of the spine without involvement of the cord, yet in my experience it is not infrequent.

The double spica cast of which Dr. Orr showed a slide is a very efficient means of fixation, and one which we use in practically all cases of fracture in the lower spine. If there is cord involvement, it is essential that foot drop be prevented, as there is a tendency to contraction of the tendo Achilles and later production of talipes equinus.

Recently a patient was brought to our Clinic who had a fracture with cord involvement. He had recovered from the damage to the cord after two years in bed, and came to see if something could not be done to get him on his feet. At operation the tendo Achillis was lengthened and within an hour he was walking about in a plaster cast with the aid of crutches.

Dr. Orr brought out the point that we must hold the parts in a position of anatomic rest. The method of fixation discussed is very valuable also in cases of anterior poliomyelitis. Contracture deformity can



practically always be prevented by proper fixation in casts or braces. A great deal of orthopedic surgery results from these contracture deformities. Extension of the head by weights and by having the body lower than the head is also very valuable, and can be aided by such technic as the sheet over an oil cloth so that the body tends to slip down. In several cases of long standing pain following fracture without cord involvement Dr. Brackett performed bone graft operations. For a patient who has suffered as long as seven years, with a disability, or if pain persists for more than one year, a bone graft should be considered. I think as reports come in during the next few years we will find many references to the question of trauma in relation to tuberculosis. I mentioned the subject once in this society and once in the state association in reporting spine and hip disease. Dr. Wilcox asked whether I had ever seen tuberculosis caused by trauma, and I answered in the negative. Trauma causes lowered resistance by which means the tuberculosis bacilli already in the system have an opportunity to form a new focus.

The point brought out by Dr. Geist of a roentgenogram with the patient in the lateral position is important.

I wish to add a word or two about the Thomas splint. This splint should be placed on every ambulance and should be carried as an emergency dressing by practically every physician, since at any time he may be called on to bring to the hospital a patient with a compound comminuted fracture of the femur. A Thomas splint to slide on the patient and tie onto the shoe will save the patient a great deal of shock and may save his life.

DR. C. E. RUTH, Des Moines, Iowa: I would like to ask Dr. Orr to tell us his experience of the value of prolonged and heavy extension in cases of fracture of the spine in which there is the development of deformity sometimes of extreme degree. I ask this question because of some experience we had at General Hospital No. 2. I recall a case that came in from overseas doubled up at an angle of nearly 90 degrees and under prolonged extension he was gradually unraveled and straightened out and a cast put on during suspension from the head. The result was extremely satisfactory. The pain and all deformity vanished. This was mentioned by Dr. Meyerding, but I would like Dr. Orr's opinion with reference to his experience in regard to it.

DR. ORR (closing the discussion): With regard to the point raised by Dr. Ruth, I have often used head extension in the manner suggested by him and regard it as highly important in lesions well up in the spine. Even in the old cases with much muscle spasm a period of head traction will be a great factor in correcting the deformity. About eight to fifteen pounds should be used with the head of the bed raised eight to twelve inches.

## STUDIES ON THE RESPIRATORY ORGANS IN HEALTH AND DISEASE\*

### I. A VALUABLE AID IN THE DIAGNOSIS OF EARLY TUBERCULOSIS

J. A. MYERS, Ph. D., M. D.

*Minneapolis, Minn.*

In the field of tuberculosis there is nothing more helpful to both physician and patient than the diagnosis of the disease in its early stage. Following such diagnosis the physician sees the possibility of restoring a high percentage of his cases to a reasonable working capacity. The patient is at once made aware of the fact that he has a terrific battle to fight and yet he is grateful for the discovery of the disease while the prognosis is good.

In cases which show questionable physical signs or symptoms it has long been the practice to examine microscopically the excreta or the body fluids in question. When the microscopic examination was negative small amounts of the suspected material were injected into laboratory animals (usually the guinea pig). Such injections were first made into the peritoneal cavity where it often took from four to six weeks, in positive cases, for the disease to manifest itself. The methods of inoculating laboratory animals have been considerably modified from time to time, but the one now employed at the Saranac Laboratory is so valuable that it should be brought to the attention of every clinician who is in any way engaged in the fight against tuberculosis.

This method is so simple that it requires no laboratory skill and can even be performed without the usual laboratory facilities. About one half cubic centimeter of the suspected material such as sputum is injected subcutaneously into the inguinal region of a guinea pig. In most of the positive cases in approximately ten to fourteen days the inguinal lymph nodes on the side of the injection become markedly enlarged and palpable. It is not necessary to section and study these nodes microscopically since so many have been studied in this way and the findings are usually those of a tuberculous lesion. To confirm the diagnosis, however, the hair is shaved from a small area, pre-

\*From the Department of Internal Medicine, University of Minnesota and the Minneapolis General Hospital, Minneapolis.



ferably the side of the pig and .005 of a centimeter of Koch's Old Tuberculin is injected into the skin (made by diluting 0.5 cubic centimeter of Koch's Old Tuberculin with 9.5 cubic centimeters of normal saline containing one-fourth of one per cent phenol. Of this solution 0.1 cubic centimeter contains 0.005 cubic centimeter of tuberculin.) In six to forty-eight hours, in the positive cases a local reaction is manifested around the site of the injection in the form of a beautiful hyperemic zone. The animals which show negative lymph nodes and a negative tuberculin test are kept under observation for several days and tuberculin tests repeated, however, if the test does not become positive within a few days after the second week one is quite safe in reporting a negative diagnosis.

It has been shown that the guinea pig even when kept in captivity does not often spontaneously contract tuberculosis, however in order to rule out possible error it is best to keep a few pigs in stock which are known to be negative to the tuberculin test.

The following two cases are cited to emphasize the value of the inoculation test:—

Case 1.—A young man gave a history of tuberculous cervical nodes on the left side which were exercised in childhood. The physical examination of his chest showed slightly impaired resonance to the second rib. A fluoroscopic examination revealed slight shading of the same area. All other physical signs were negative. There were no symptoms of active pulmonary tuberculosis. His left ear began discharging several months before the examination and a slight discharge persisted. Stained smears made from the aural discharge revealed no tubercle bacilli. A biopsy showed a suspicious tuberculous lesion. A small amount of the discharge was injected into the inguinal region of a guinea pig. Ten days later the inguinal nodes were palpable. At the end of the twelfth day the pig gave a negative reaction to the tuberculin test. When repeated on the fourteenth day, however, the tuberculin test was positive. The pig died of bronchopneumonia a few days later and stained smears made from the inguinal nodes showed numerous tubercle bacilli.

Case 2.—A man of twenty-seven years, with an average weight of 190 pounds, who always

had excellent chest expansion and lung capacity developed a "cold" three months ago. He continued working but was occasionally conscious of increased temperature. About three days before he was first seen he had a slight hemoptysis which came on after he had indulged in considerable singing. His temperature was 100.6°, pulse 96 per minute and hemoglobin 70 per cent. The physical examination showed the excursion slightly decreased below the second rib, tactile fremitus increased over same area with very little change in the percussion note. Moderately coarse rales were elicited over the lower two thirds of the right lung, anteriorly. Fluoroscopic examination revealed considerable shading of the right middle lobe. Stereoscopic plates revealed the following: "The right middle lobe showed a soft homogeneous consolidation, diminishing in intensity toward the periphery. Near the top of this consolidation near the anterior wall is a ragged cavity." "The outstanding feature is the right middle lobe consolidation was cavity formation. It represents either an acute tuberculosis or an acute pulmonary abscess. The weight of evidence is in favor of the abscess." Microscopic examinations of the sputum revealed no tubercle bacilli.

The active lesion being located in the "non-tuberculous field of the lung," the x-ray findings and the apparent absence of tubercle bacilli in the sputum made a diagnosis of tuberculosis somewhat questionable, nevertheless the patient was placed on a very strict antituberculous regimen. A three day specimen of sputum was collected, one-half cubic centimeter was injected subcutaneously into the inguinal region of a guinea pig. On the ninth day the inguinal nodes were palpable and on the tenth day the tuberculin test was negative. On the fifteenth day, however, the tuberculin test was very positive. Five weeks after the sputum was injected the animal died and the autopsy showed that in addition to the enlargement of the lymph nodes the spleen, liver and lungs were studded with tubercles.

This test is easily performed, is accurate and often enables one to make a diagnosis from several days to weeks before it could otherwise be made. Since early recognition is of such vast importance in tuberculosis this test deserves to be more frequently employed.



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Vol. IV August, 1921 No. 8

## EDITORIAL

### ORGANIZED MEDICINE

Since the organization of the American Medical Association in 1848, the development of this Association has been phenomenal. Composed as it is of the component County and State societies, the organization makes for efficiency and is destined to remain perhaps the leading medical association of the world.

The purposes for which the American Medical Association was organized are too well known to require comment, and yet it may be well to pause at times and consider how we may best carry out the ideals which are the aim of this association.

The organization will gain in strength and approach its ideals in direct proportion to the manner in which its integral parts develop, and without the development of the County and State societies, the American Medical Association must fail to advance. The present era has witnessed the development of a multiplicity of medical societies, each with its special function to perform, thus pointing to a sincere desire on the part of physicians to exchange with each other all of the scientific knowledge which they have been able to acquire.

Some associations have been formed of

those doing special lines of work, and some upon lines that are purely geographical. While all associations are dependent largely for success upon the inherent worth of their members, success of the "geographic" organizations is dependent more especially upon the dynamic force of some one or more of its members, and we see numerous examples of this fact, one of the most striking perhaps appearing in our own State. Excellent programs, composed largely of outside talent, serve to bring to these meetings large and enthusiastic audiences, with great benefit to all concerned.

The County and State societies, as well as the mother society, the American Medical Association, comprehends a somewhat different function from a number of standpoints. We have in mind especially the development of the individual members of these associations, and in this manner, the society as a whole. The County and State societies must act as the training school for the national organization.

The introduction of too much foreign talent into these meetings, while it might apparently bring immediate temporary success, can not fail to have an inhibitory effect upon the younger members of these organizations, and to a marked degree, retard their development. The success of the State associations must depend largely upon the sum total of the output of its individual members, that is, by the excellence of the program which the association itself is able to produce.

With this idea in mind we would suggest greater care, and the expenditure of more time in the preparation of the program for State meetings, and while everyone desiring to be heard should have an opportunity we believe it would be well to make an effort to exhibit the best material which our State association can contribute. Possibly the program committee should be given a longer tenure of office in order to bring this about. The writers of papers should be selected many months before the Association meets. This would insure excellent programs of absorbing interest, and with the officers of the Association functioning properly, keeping the essayists well within their time limit, and arranging for short and snappy discussions, the State Medical Association

tion should have no difficulty in performing the function for which it was established.

There is another duty, however, which falls upon each and every member of the Association, and that is the duty of attending the State Convention whenever it lies within his power to do so. It is obvious that but a small percentage of the membership can or will take part in the preparation and discussion of scientific papers. The remaining members should, at the very least, attend the Convention, not only because it is a patriotic duty, but for personal benefit which is sure to be derived from such attendance. The hospitality of the City of Duluth, which has the honor of entertaining the Association this year, is not to be excelled. The officers of the Association are entitled to the support of every member, and their names alone insure the excellence of the program. Every member of the State society should take advantage of this opportunity to enjoy a short vacation and a scientific treat.

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### CHEMICAL PRODUCTION IN AMERICA

It is highly desirable that the pre-war world monopoly in certain branches of the chemical and drug business held by Germany, shall not be regained. As a result of war necessity our infant chemical industries grew tremendously. The manufacture of high explosives was of vital necessity; the production of dyes, which industry had been held as a world monopoly by Germany, became necessary; in the production of certain drugs, such as aspirin, atophan and salvarsan, many of which are coal tar derivatives and were highly essential to the nation's health, had to be developed in a comparatively short time. The unavoidable delay in the development of these fields in chemistry, which are so closely associated in a productive way, was costly.

The chemical industry of the country is much disturbed at the present, and rightly so, at the prospect of Germany regaining her former position through cheaper production and patronage by the German government. For years the law in Germany required an "arbeit" of the young men in the chemical and medical profession, and, these thousands of researches have resulted in a corresponding development

of the chemical and medical activities. Government assistance made it possible for six large chemical concerns to develop with an output sufficient to supply an enormous foreign trade. It has been shown how it was possible with production on such a large scale to cut prices temporarily in foreign countries where ever competition arose and thus prevent rivals from doing business. This German industry is likely to strangle our newly developed industry unless government aid in the form of protective tariff, an actual embargo on German products, or encouragement of chemical research is instituted. This is an economic question and must be decided at Washington.

At the risk of crying "Wolf! Wolf!" we wish to call attention to the use of chemicals in the last war in the form of high explosives and poisonous gasses. There is every indication that in any future war involving an educated (we purposely avoid the term civilized) nation, chemicals will be more generally used. What the future in chemical warfare holds, is food for the most fantastic imagination. Poisons are known three drops of which coming in contact with the skin will cause death. An ounce of diphenyl-chlor-arsine explodes continuously for a period of weeks. What next?





# REPORTS AND ANNOUNCEMENTS OF SOCIETIES

## MINNESOTA STATE MEDICAL ASSOCIATION ANNUAL MEETING

August 24, 25, 26, 1921 Central High School, Duluth,  
Minnesota

### PROGRAM

Thursday, August 25th  
9:00 A. M.

### MEDICAL SECTION

S. H. Boyer, M. D., Chairman; Charles B. Wright, M. D., Secretary

1. "Duodenal Ulcer Treatment, Late Results"—Thomas R. Martin, M. D., Duluth.
2. "The Etiology and Laboratory Diagnosis of Actinomycosis"—A. H. Sanford, M. D., T. B. Magath, M. D., Rochester.
3. "Anaphylaxis to Food Proteins in Breast-Fed Infants and its Probable Relation to Certain Diseases of the Nursing Infant Especially Exudative Diathesis"—W. Ray Shannon, M. D., St. Paul.
4. "Dermatology and Internal Medicine"—S. E. Sweitzer, M. D., Minneapolis.
5. "Carcinoma of the Lung; a Study of its Incidence, Pathology and Clinical Important with Report of 13 Cases Studied at Necropsy"—Moses Barron, M. D., Minneapolis.
6. "Differential Diagnosis between Tuberculosis and other Lung Conditions"—Frank Spicer, M. D., Duluth.
7. "Referred Pain in Heart Disease"—Charles N. Hensel, M. D., St. Paul.
8. "The Differential Diagnosis between Mixedema Mongolian Idiocy, Rickets and Congenital Syphilis, with Special Reference to the X-ray as a Diagnostic Aid"—T. L. Birnberg, M. D., St. Paul.

AUGUST 25, 9:00 A. M.

### SURGICAL SECTION

J. T. Rogers, M. D., Chairman; T. L. Chapman, M. D., Secretary.

1. "Ulcer of the Bladder and its Surgical Treatment"—Verne C. Hunt, M. D., Rochester.
2. "Cystocele and Prolapse"—Robert Earl, M. D., St. Paul.
3. "The Surgical Treatment of Painful Scars"—J. F. Corbett, M. D., Minneapolis.
4. "Treatment of Tuberculosis of Spine"—Wallace H. Cole, M. D., St. Paul.
5. "Suspensions and Traction in the Treatment of Fractures"—A. W. Ide, M. D., B. I. Derauf, M. D., Brainerd.
6. "Urinary Lithiasis in Childhood and Infancy"—Gilbert J. Thomas, M. D., Minneapolis.
7. "Blastomycosis; Clinical Pathology and Therapeutics"—Benjamin Davis, M. D., Duluth.
8. "Pyernia of Otic Origin"—(To be read by proxy)—Horace Newhart, M. D., Minneapolis.

Afternoon Session—August 25th

Joint Meeting Medical and Surgical Sections.

Call to Order, 2:00 P. M.

1. Address of Welcome—Mayor S. F. Snively, Duluth.
2. Presidential Address "Minnesota Medicine in the Making—Personal Reminiscences"—C. Eugene Riggs, M. D., St. Paul.
3. "Diagnosis of Breast Tumors at the Exploratory Incision"—Joseph Bloodgood, M. D., Baltimore.
4. Intestinal Polypi and Their Relation to Carcinoma.—Margaret Warwick, M. D., St. Paul.

### THE ANNUAL BANQUET

Thursday Night, 6:30 Sharp  
MASONIC TEMPLE

THIRD DAY—FRIDAY, AUGUST 26th  
9:00 A. M.

### MEDICAL SECTION

1. "The Vital Capacity of the Lungs in Cardiac Disease"—Henry L. Ulrich, M. D., Morris H. Nathanson, M. D., Minneapolis.
2. "The Results in Treatment of Inflammatory Diseases of the Gall Bladder and its Ducts"—Orville N. Meland, M. D., Warren.
3. "Hysterical Dysphagia"—Porter P. Vinson, M. D., Rochester.
4. "Arteriosclerosis of the Nervous System"—Henry W. Woltman, M. D., Rochester.
5. "Manifestations of the Spasmophilic Diathesis in Older Children"—C. A. Scherer, M. D., Duluth.
6. "A Comparison of Lung Capacity Readings and Physical Signs in Pulmonary Tuberculosis"—J. A. Myers, M. D., Minneapolis.
7. "Report of an Epidemic of Paratyphoid Fever Among University Students"—C. A. McKinley, M. D., Minneapolis.
8. "Mental Hygiene and the General Practitioner"—J. C. Michael, M. D., Minneapolis.

AUGUST 26th—9:00 A. M.

### SURGICAL SECTION

1. "The Treatment of Pericarditis with Effusion"—Carl Hedblom, M. D., Rochester.
2. "Potter Version"—W. A. Coventry, M. D., Duluth.
3. "Principles Governing the Treatment of Fractures"—E. K. Green, M. D., Minneapolis.
4. "Marginal and Jejunal Ulcers Following Gastro-Enterostomy"—F. C. Schuldt, M. D., St. Paul.
5. "Circulatory Foot Disturbance"—Emil S. Geist, M. D., Minneapolis.
6. "Goiter Surgery"—F. J. Plondke, M. D., St. Paul.
7. "The Open Treatment of Fractures"—A. F. Schmitt, M. D., Mankato.
8. "Cosmetic Rhinoplasty"—J. D. Lewis, M. D., Minneapolis.

Afternoon Session—August 26th.

Joint Meeting Medical and Surgical Sections.

1. The Relief of Jaundice Due To Pancreatic Obstruction.—C. H. Mayo, M. D., Rochester.
2. "The Clinical Estimate of Myocardial Damage"—S. Marx White, M. D., Minneapolis.
3. "The Gall Bladder as the Source of Focal Infection"—B. S. Adams, M. D., Hibbing.
4. Report of the House of Delegates.
5. Installation of the President.

## THE SECOND INTERNATIONAL CONGRESS OF EUGENICS

Plans on a rather extensive scale are being made for this Congress which will meet at the American Museum of Natural History, New York City, September 22d-28th, 1921. While the program has not as yet been announced, the list of those invited to present papers includes many names of international prominence, a considerable proportion being medical men.

The congress is divided into sections which will consider various phases of eugenics such as: the results of research, factors which influence the birth date, human racial differences, and the relation of eugenics to the state.

The fifty-third annual meeting of the Wabasha County Medical Society was held in Plainview, July 7, 1921. The following program was presented:

Cancer of the Rectum Operated on by the Electro-Coagulation Method—Dr. G. Schmidt, Lake City.

The Treatment of Anemia—Dr. J. P. Schneider, Minneapolis.

The Tuberculous Patient—Dr. W. K. Quackenbush, Wabasha.

Dislocation of the Lower Radio-Ulnar Articulation—Dr. E. H. Bayley, Lake City.

A hearty vote of thanks was extended by the members present to Dr. J. P. Schneider of Minneapolis for his helpful address, to the visiting physicians of the Mayo Clinic Staff for taking part in the discussions, and to Dr. and Mrs. Slocumb, and all others helping in the entertainmet of the society.

### 24th Annual Meeting of the Medical Library Association

The 24th Annual Meeting of the Medical Library Association, whose membership includes all of the larger medical libraries of the country, and a large number of individual members, consisting of those interested in furthering medical library work, was held in Boston June 6, 7, 8, 1921. The business meetings of the Association were held in the Boston Medical Library. In addition to the address of the President the program contained the report of a committee on Standard Classifications, and the system used in the Boston Medical Library, and this as explained by the Chairman, Mr. James F. Ballard, was adopted, as being the most practical solution for meeting the perplexing problems of classification. This was followed by a discussion on Reference Aids, which was opened by Mrs. Grace W. Myers, of the Treadwell Library of the Massachusetts General Hospital. An evening meeting, which was largely attended, was addressed by the President, Dr. John W. Farlow, of the Boston Medical Library. This was followed by an interesting paper, illustrated by lantern slides, by Dr. George S. Huntington, of New York City, entitled "Some historical facts concerning the catoptron of Johannes Remmelinus, and the superimposed anatomical plate during the early

part of the 17th century." Following this Dr. Malcolm Storer, of Boston, read a paper entitled "Interesting medical medals."

The permanent headquarters of the Medical Library Association are in the Medical and Chirurgical Faculty Building, at 1211 Cathedral Street, Baltimore, Maryland.

## NEWS OF THE HOSPITALS

The Isle hospital at Isle, Minn., has filed articles of incorporation. The capital stock is \$10,000.

On the night of July 11th Dr. George K. Hagaman awarded diplomas to seven graduate nurses at the Childrens Home 2239 Commonwealth Ave., St. Paul.

Of the seventy-eight operations recently performed by Colonel Henry Smith at St. Joseph's Hospital St. Paul, seventy-four have been reported a complete success.

Adah H. Patterson, superintendent of St. Luke's Hospital, St. Paul, has been spending her vacation in Canada. Dr. A. R. Colvin, of the staff, was recently absent for a few days on an outing at Lindstrom Minn.

Miss Leila Halverson, superintendent of St. Paul Hospital was recently absent on her vacation in North Dakota. The hospital is contemplating an extensive addition to its X-Ray Department in the near future.

The Northwestern Medical and Surgical association at a meeting at Brainerd authorized an increase in capital stock from \$50,000 to \$150,000. Amendments to the articles of incorporation, filed in the office of Mike Holm, secretary of state, today provided for such an increase.





# MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

## PHYSICIANS LICENSED AT THE JUNE (1921) EXAMINATION TO PRACTICE IN THE STATE OF MINNESOTA BY EXAMINATION

| NAME                                | WHERE AND WHEN GRADUATED                                 | RESIDENCE                              |
|-------------------------------------|--|--|
| Ahlfs, Jacob Johnson.....           | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., St. Luke's Hospital.  |
| Anderson, Frank William.....        | Harvard, M. D., 1918.....                                | Rochester, Minn.                       |
| Bayard, Harry Fred.....             | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., 728 Cherokee Ave.     |
| Bessesen, Alfred Nicholas, Jr. .... | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 1001 W. 36th St.   |
| Bessesen, Daniel H. ....            | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 1001 W. 36th St.   |
| Blosmo, Oscar J. ....               | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 316 Leamington.    |
| Boyd, Julian Deigh .....            | U. of Iowa, M. D., 1921.....                             | Caledonia, Minn.                       |
| Bratrude, Earl Jeffrey.....         | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., General Hospital.  |
| Brown, Alex. Edward.....            | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., 9 West Delos St.      |
| Bulkley, Kenneth.....               | Columbia U., M. D., 1909.....                            | Minneapolis, Minn., 420 Syndicate Bdg. |
| Dittrich, Raymond Joseph.....       | U. of Minn., M. B., 1921.....                            | New Ulm, Minn.                         |
| Eder, Howard Leslie.....            | U. of Minn., M. B., 1921.....                            | Blue Earth, Minn.                      |
| Engelhart, Peter Clarence.....      | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 629 Wash. Av. SE.  |
| Freymler, Ernest Fred.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 1138-14th Av. SE   |
| Fritz, Haeberlin.....               | (U. of Lausanne, 1920).....<br>(U. of Zurich, 1919)..... | St. Paul, Minn., Piedmont Apt. 36 B.   |
| Frudenberg, Henry H. ....           | U. of Ill., M. D., 1902.....                             | Minneapolis, Minn., 4912 Harriet Av.   |
| Gamble, Ross Merrill.....           | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 429 Union St. SE.  |
| Geyman, Milton John.....            | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 509 E. River Rd.   |
| Haeberlin, Fritz.....               |  | Remer, Minn.                           |
| Hanson, Elmer C. ....               | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., Swedish Hospital.  |
| Hanson, William Arthur.....         | U. of Minn., M. B., 1920.....                            | Rochester, Minn.                       |
| Harbo, Harold Eyvind .....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 730 22nd Av. So.   |
| Hauser, Emil Dan. Wm. ....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 2924 Girard Av. S. |
| Hauser, Louis Arthur.....           | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., 914 Lowry Bldg.       |
| Hauser, Victor Paul.....            | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., 696 Goodrich Ave.     |
| Howard, Merrill Arthur .....        | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 3322 Oakland Av.   |
| King, Frances Willard.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., University Hosp.   |
| Langhoff, Arthur Harry.....         | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., Swedish Hosp.      |
| Lapierre, Arthur Paul.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 319 Univ. Av. NE.  |
| Lindquist, Richard Herman.....      | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 2300 16th Av. S.   |
| Litman, Morris H. ....              | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., University Hosp.   |
| Litman, Samuel N. ....              | U. of Minn., M. B., 1921.....                            | Duluth, Minn., 128 E 5th St.           |
| Matsner, Eric M. ....               | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., General Hosp.      |
| Nesbit, Harold Thompson.....        | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 429 Union St. SE   |
| Ott, William Oscar.....             | Rush, M. D., 1914.....                                   | Rochester, Minn.                       |
| Pankow, Louis Julius.....           | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., University Hosp.   |
| Parker, Harry Lee.....              | Dublin U., 1918.....                                     | Rochester, Minn.                       |
| Perley, Arthur Eugene.....          | U. of Vermont, M. D., 1918.....                          | Rochester, Minn.                       |
| Peterson, Peter Eberhart.....       | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 201 Walnut St. SE. |
| Prentice, John Watson.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 429 Union St. SE.  |
| Puestow, Karver Louis.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 509 E. River Road  |
| Richter, Edward Henry.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., University Hosp.   |
| Roberts, Frank Lester.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., N. W. Hosp.        |
| Rogers, Richard Samuel.....         | U. of Minn., M. B., 1921.....                            | Bismarck, N. D.                        |
| Rosenberg, Maurice N. ....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 2910 James Av. S.  |
| Rosenthal, Boles Albert.....        | U. of Minn., M. D., 1917.....                            | St. Paul, Minn., 415 Iglehart          |
| Rucker, William Henry.....          | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., N. W. Hospital.    |
| Ruhberg, Geo. Noel.....             | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 619 Ontario St. SE |
| Rumpf, Carl Walter.....             | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., 429 Union St. SE.  |
| Rumpf, William Henry, Jr. ....      | U. of Minn., M. B., 1921.....                            | Fairbault, Minn.                       |
| Sansby, J. Martin.....              | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., 972 Goodrich Av.      |
| Siperstein, David Maurice.....      | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., General Hospital.  |
| Sisler, Clifford Edwin.....         | U. of Minn., M. B., 1921.....                            | St. Paul, Minn., City Hospital.        |
| Vail, James Bradford.....           | U. of Minn., M. B., 1921.....                            | Minneapolis, Minn., General Hospital.  |
| Van Beeck, Gregory.....             | U. of Minn., M. B., 1921.....                            | Hastings, Minn.                        |
| Wheeler, Theodora .....             | Johns Hopkins, M. D., 1916.....                          | Rochester, Minn.                       |

### THROUGH RECIPROCITY

|                                  |                       |                                       |
|----------------------------------|-----------------------|---------------------------------------|
| Ellison, David Elias.....        | U. of Ill., 1916..... | Minneapolis, Minn., 1500 Hennepin Av. |
| Fleming, Claude Filmore.....     | Rush, 1903.....       | Minneapolis, Minn., The Buckingham.   |
| Gordon, Charles Howard.....      | Bowdoin, 1919.....    | U. of Minn., Minneapolis, Minn.       |
| Greaves, Fredk. Clarence.....    | U. of Iowa, 1920..... | New Market, Minn.                     |
| McCradie, Andrew Ross.....       | U. of Ill., 1920..... | Hendrum, Minn.                        |
| Risser, Edward Daniel.....       | U. of Iowa, 1918..... | Des Moines, Iowa, 1702 Arlington Av.  |
| Strauss, Frederick Bismarck..... | Rush, 1901.....       | Bismarck, N. D.                       |

Thomas McDavitt, Secretary, St. Paul.

## OF GENERAL INTEREST

Dr. John Mills, of Minneapolis, has become associated with Dr. H. M. Hursh, of Grand Rapids, Minn.

Dr. O. H. Rystad, of Crookston, has taken charge of Dr. L. A. Lane's practice during the latter's absence in the east.

Dr. Harold C. Habein, of Minneapolis, has opened offices in the LaSalle Building. He will specialize in internal medicine.

Dr. P. K. Dahl, of Minneapolis, has moved to Kensington, Minnesota, where he will engage in the practice of medicine.

Dr. A. S. Hoiland, of Argyle, has sold his practice to Dr. A. H. Nerad, who has been associated with him for some months.

Dr. C. C. Walker, of Lamberton, has located at Raymond, Minnesota, where he will take over the practice of Dr. Bergheim.

Dr. O. F. Melby, of Thief River Falls, is in Chicago where he is taking a post graduate course in eye, ear, nose and throat work.

Dr. Bernard Sorose, of Barnesville, is now located at Spring Grove, where he has formed a partnership with Dr. M. S. Nelson, of that place.

Dr. W. H. Rowe, of St. James, has gone to New York where he will spend three months studying treatment of the eye at the Herman Kratt Memorial Hospital.

Dr. Douglas, of the State Sanatorium medical Staff, at Walker, is in New York where he is taking a six weeks post graduate course in one of the large hospitals.

Dr. Rollier, of Minneapolis, has arranged to give a short post-graduate course of demonstrations of heliotherapy at Leysin (Switzerland) from August 16 to August 20th.

Dr. Albert Thompson, of St. James, has recently returned from Chicago where he has been taking a post graduate course in diseases of the eye, ear, nose and throat.

Dr. T. N. Fleming, of Cold Springs, has moved to St. Cloud, where he has opened offices. Dr. Fleming will limit his practice to diseases of the eye, ear, nose, and throat.

Dr. W. J. Mayo has recently been elected an honorary member of the Medico-Chirurgical Society of Edinburgh. The honorary membership of this society is limited to ten.

Dr. J. A. Butz and family, of Monterey, are in California where they will remain until September. Dr. Hoffin, of Minneapolis has charge of Dr. Butz's practice during his absence.

Dr. A. J. Paulson has severed his connection with the Physicians Hospital at Thief River Falls, and has gone to Watertown, S. D., where he has become associated with the Watertown Clinic.

Dr. J. S. Collins, of Caledonia, has sold his practice to Dr. Boyd, of Iowa City, Iowa. Dr. Collins will

open offices at Wabasha, and will be chief surgeon at St. Elizabeth's Hospital in that city.

Dr. Carl Fiske Jones, of Minneapolis, who has been associated with Dr. A. E. Benjamin for the past two years is leaving about August 8th for a year's study in Vienna. He will confine his work to obstetrics and gynecology.

The partnership of Drs. Rowe and Thompson, of St. James, has been dissolved and Dr. O. H. Ternstrom, of Bismarck, N. D., has become associated with Dr. Rowe. Dr. Thompson will continue in practice at St. James.

Dr. Alexander Stewart, A Fellow in Pediatrics in the Medical School of the University of Minnesota, who has just completed six months' service in the Mayo Foundation, has become associated with Dr. W. R. Ramsey, of St. Paul.

Dr. Rollis Holley, formerly of East Grand Forks, and who has been taking post graduate work at Kansas City since leaving the service a year ago, has recently joined the staff of physicians at the Warren Hospital, Warren, Minn.

Twenty-five Fellows entered service in the Mayo Foundation July 1; they are majoring in the following: general medicine 10, general surgery 4, orthopedic surgery 1, ophthalmology 1, otolaryngology 1, pediatrics 2, dermatology 2, and dental surgery 4.

Dr. Charles E. Proshek, of New Prague, who for the past two years has been with the American Red Cross in Asia and Europe, was recently transferred to the American Red Cross Commission in Greece, where he will act as aid to the Red Cross Commissioner. His headquarters will be at Saloniki, Greece.

The first issue of *The International Journal of Gastro-Enterology* appeared recently and is devoted as its name implies to diseases of the digestive tract and allied branches of medicine. A unique policy of the Journal will involve the criticism and commentaries by four well known authorities on each article published.

Dr. Harold E. Robertson, formerly Director of Pathology and Bacteriology in the Medical School of the University of Minnesota, has been transferred to the staff of the Mayo Foundation of the University as Professor of Pathology. Dr. Robertson has also become a member of the staff of the Mayo Clinic as Head of the Section on Pathologic Anatomy.

At the annual dinner of the American Anesthetists in Boston, held at the time of the A. M. A. meeting, Dr. S. Adolphus Knopf, who was a leading advocate for the honoring of Morton by election to the Hall of Fame, stated it would be a proud privilege for the Associated Anesthetists to place a bronze bust of Morton in the niche assigned him by the electors. This will be done on October 16, 1921, in celebration of the Diamond Jubilee Anniversary of Morton's first public demonstration of ether anesthesia. Anesthetists and other members of the profession interested are urged to send contributions at once to F. H. McMechan, Sec-Treas., Associated Anesthetists, Lake Shore Road, Avon Lake, Ohio.



## MINNESOTA PUBLIC HEALTH ASSOCIATION

The appointment of Dr. William F. Wild as Executive Secretary of the Minnesota Public Health Association has been announced by Dr. C. L. Scofield, President of the Health Association. Dr. Wild took office July 1, and succeeds Dr. H. W. Hill, who resigned to become director of the Institute of Public Health at London, Ontario, Canada.

The policy of the Association to prevent disease, tuberculosis in particular, and to help every person in Minnesota to be healthy and efficient through demonstration, legislation, and education; that is, by demonstrating the methods of keeping well, by educating the public in the rules of health, and by securing the passage of laws which will provide for the protection of health, will be continued under Dr. Wild's leadership, the Association states.

The past year's work has been marked for its accomplishments according to the Executive Committee, the governing body of the Association. Some 43,307 persons have been given expert medical examination and advice free in the 699 health clinics given under the auspices of the Minnesota Public Health Association and the County Public Health Association; 200,000 school children have participated in the Minnesota Health Crusade, and performed daily the "health chores," such as, washing the hands before and after meals, drinking a certain amount of water, sleeping the required number of hours each night with windows open, eating cereals and vegetables, brushing the teeth regularly and taking a full bath frequently; 172,000 pamphlets on health have been distributed; a health journal has been published each week and sent to 5,000 persons; talks on health given, and all forms of health work encouraged and assisted. During the last session of the legislature the Minnesota bill for the protection of mothers and infants was sponsored and supported by the Minnesota Public Health Association and became a law. This bill provides for the state acceptance of the Sheppard-Towner bill in the event of its becoming a law. Other bills relating to the advancement of public health, such as those providing for appropriations for the work of the tuberculosis sanatoria and the State Board of Health were actively supported.

The work of the Minnesota Public Health Association is supported by the annual sale of Christmas seals.



## CORRESPONDENCE

Minnesota  
STATE BOARD OF HEALTH  
Division of Preventable Diseases  
University Campus

Minneapolis, Minn.,  
June 21, 1921

Editor Minnesota Medicine.

Dear Doctor:

After July, 1921, the Poliomyelitis After-Care Work, which has been carried on by the State Board of Health since 1917, will be under the State Hospital for Indigent Crippled & Deformed Children.

As heretofore, you are asked to report, without delay, all frank and suspected cases of acute Anterior Poliomyelitis and Epidemic Meningitis directly to the Division of Preventable Diseases, University Campus, Minneapolis. Please also report frank and suspected cases of Epidemic (Lethargic) Encephalitis. As far as possible an Epidemiologist will be sent to study cases and assist in diagnosis and control of disease. Antimeningitis Serum will be sent on first train upon notification of meningitis cases. Special outfits for collection of spinal fluid are furnished on request.

All cases of Poliomyelitis reported to the State Board of Health will be referred to the State Hospital for follow-up after-care when convalescence sets in.

The transfer of this work to the State Hospital is made through action of the last Legislature upon recommendation of the State Board of Health with full knowledge and consent of the State Hospital authorities.

Respectfully,

A. J. CHESLEY,

Executive Officer.

## NEW AND NON-OFFICIAL REMEDIES

During June the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

The Abbott Laboratories:

Saligenin

Armour & Co.:

Suprarenalin Base

Suprarenalin Ointment

E. Biuhuber:

Santyl Capsules

The Calco Chemical Co.:

Amidopyrine-Calco

Hynson, Westcott & Dunning:

Tablets Mercurochrome 220-Soluble

H. A. Metz Laboratories:

Orthoform

Winthrop Chemical Co.:

Mesotan

Nonproprietary Articles:

Amidopyrine

**Guaiaacol Benzoate.**—**Benzosol.**—The benzoic acid ester of guaiacol. Guaiaacol benzoate is slowly decomposed in the intestinal tract into benzoic acid and guaiacol, which exert their usual action. It is said to be useful in the incipient pulmonary tuberculosis, as an intestinal antiseptic and a urinary antiseptic.

**Guaiaacol Benzoate.**—**Seydel.**—A brand of guaiacol benzoate N. N. R. Seydel Manufacturing Co., Jersey City, N. J. (Jour. A. M. A., June 4, 1921, p. 1575).

**Saligenin.**—**Abbott.**—A brand of saligenin N. N. R. For a discussion of the actions, uses and dosage of saligenin, see New and Non-official Remedies 1921, p. 35. Abbott Laboratories, Chicago.

**Santyl Capsules 7 drops.**—Each capsule contains 7 drops of Santyl. See New and Non-official Remedies 1921, p. 270. E. Bilhuber, Inc., New York.

**Silver Salvarsan.**—A brand of silver arsphenamine N. N. R. For a description of the actions, uses and dosage of silver arsphenamine, see Jour. A. M. A., May 7, 1921, p. 1312. Silver Salvarsan is marketed in ampules containing respectively 0.05 Gm., 0.1 Gm., 0.15 Gm., 0.2 Gm., 0.25 Gm., 0.3 Gm., silver salvarsan. H. A. Metz Laboratories, New York (Jour. A. M. A., June 11, 1921, p. 1654).

**Pituglandol-Roche.**—An aqueous solution containing the active constituents of the posterior lobe of the pituitary gland of cattle free from preservatives. It is physiologically standardized on the isolated uterus of the virgin guinea-pig so that 1 Cc. corresponds in activity to 0.003 Gm. betainimazolyethylamine hydrochloride. For a discussion of the actions and use see General Article, Pituitary Gland, New and Non-official Remedies 1921, p. 219. Pituglandol-Roche is marketed in ampules, each containing 1.1 Cc. Hoffman LaRoche Chemical Works, New York.

**Pollen Antigens-Lederle.**—Liquids obtained by extracting the dried pollen of plants with a liquid consisting of 67 per cent glycerine and 33 per cent saturated solution of sodium chloride. For the action and uses of pollen extract preparations, see New and Non-official Remedies 1921, p. 239. Pollen antigens-Lederle are supplied in 15 pollen unit strengths. They are marketed as follows: Series A, containing five vials containing, respectively 1.5, 3, 6, 12 and 15 pollen units. Series B, five vials containing 18, 30, 45, 60 and 90 pollen units. Series C, five vials containing, respectively, 150, 225, 300, 450 and 600 pollen units. Complete Series, containing the fifteen doses of Series A, B, and C. Diagnostic Test, containing 0.01 Cc. of a dilution representing 60 pollen units.

**Pollen Antigen-Lederle (Ragweed).**—A liquid prepared by extracting the proteins from the pollen of the ragweed.

**Pollen Antigen-Lederle (Timothy).**—A liquid prepared by extracting the protein from the pollen of the timothy. The Lederle Antitoxin Laboratories,

New York (Jour. A. M. A., June 18, 1921, p. 1753)

**Cholera Vaccine (Prophylactic) — Lederle.**—A cholera vaccine (see New and Non-official Remedies 1921, p. 299) marketed in packages of two 1 Cc. vials containing, respectively, 4,000 and 8,000 million killed cholera vibrios; also in packages of two 10 Cc. vials containing, respectively, 4,000 and 8,000 million killed cholera vibrios per Cc. The Lederle Antitoxin Laboratories, New York.

**Plague Vaccine (Prophylactic) — Lederle.**—A plague vaccine (see New and Non-official Remedies 1921, p. 304), marketed in 1 Cc. vials containing 5,000 million killed plague bacilli; also in 10 Cc. vials containing 5,000 million killed plague bacilli per Cc. The Lederle Antitoxin Laboratories, New York.

**Acne Mixed Vaccine—Gilliland.**—A mixed bacterial vaccine (see New and Non-official Remedies 1921, p. 314) composed of *B. acni vulgaris*, *staphylococcus albus* and *staphylococcus aureus* in equal proportions. Marketed in packages of four 1 Cc. vials containing, respectively, 250, 500, 1,000 and 2,000 million killed bacteria; also in packages of four syringes containing, respectively, 250, 500, 1,000 and 2,000 million killed bacteria. Gilliland Laboratories, Ambler, Penna.

**Suprarenalin.**—Vials containing 1 grain suprarenalin (see Jour. A. M. A., May 14, 1921, p. 1353). Armour and Co., Chicago.

**Suprarenalin Ointment.**—An ointment containing 0.1 per cent. suprarenalin (see Jour. A. M. A., May 14, 1921, p. 1353), suspended in a petrolatum base. Armour and Co., Chicago (Jour. A. M. A., June 25, 1921, p. 1826).

#### PROPAGANDA FOR REFORM

**"National Iodine Solution" Not Admitted to N. N. R.**—The Council on Pharmacy and Chemistry considered National Iodine Solution, a proprietary of the National Drug Co., because inquiries indicated that it was brought extensively to the attention of physicians. The name implies that it is a solution of iodine, and the inference is given that it has the advantages of iodine without the disadvantages. According to the label, "each fluid ounce represents three grains proteo-albuminoid compound of iodine (National)"; also an alcohol declaration of 7 per cent. is made. Otherwise no information is given as to the composition either of the "solution" or of "Proteo albuminoid compound of iodine." Analysis in the A. M. A. Chemical Laboratory indicates that each 100 c. c. contains about 7 c. c. of alcohol, 0.5 Gm. of zinc sulphate U. S. P., 0.03 Gm. iodine (the solution gave tests which indicated a very small amount of free iodine; most of the iodine was in the form of ordinary iodide), 0.01 gm. protein and some hamamelis water. While the preparation is claimed to contain 3 grains "proteo-albuminoid compound of iodine," yet the sum of the protein and iodine is equivalent to less than one fifth grain. The Council reports that it is evident that "National Iodine Solution" is not a solution of free (elementary) iodine as the name suggests; instead, it appears to be



a solution of zinc sulphate in witch hazel water containing less than 0.03 per cent. of combined iodine and not more than a trace of free iodine; that it is sold under unwarranted therapeutic claims, and that a similar or identical preparation sold to the public for the self treatment of gonorrhea by the National Drug Co., as Gonocol has been declared misbranded by the Federal authorities (Jour. A. M. A., June 4, 1921, p. 1592).

**Reolo.**—This is a "patent medicine" which is based on the theory which has no scientific foundation, that all disease is due to a deficiency or variation in the inorganic constituents—the "cell salts"—of the cells and blood. Reolo is claimed to furnish the needed cell salts and thus to cure diseases due to the deficiency. The asserted discovery of Reolo is described thus: "Dr. A. L. Reusing has finally succeeded in combining by electrical treatment the phosphates of calcium, sodium and iron with the phosphates of potassium and magnesium and has obtained a perfect combination of these revitalizing Cell Salts that he has named 'Reolo'...." The A. M. A. Chemical Laboratory reports that Reolo consists of grayish brown tablets having a sweet, chocolate-like and faintly bitter taste. Very small quantities of a phosphate and traces of magnesium and of an iron compound were present. Large amounts of calcium carbonate (chalk) and sucrose (cane sugar) were present. The tablets did not appear to be medicated in the usually accepted sense. From this examination it would appear that Reolo is essentially a mixture of sugar and chalk (Jour. A. M. A., June 11, 1921, p. 1697).

**Disappointments in Endocrinology.**—In the current enthusiasm for so-called endocrinology, medicine may become humiliated by the drift toward a sort of pseudoscience bolstered up with meaningless words and unfounded assumptions. Stewart deserves the thanks of the medical profession for the fearless and critical manner in which he has questioned (Endocrinology, vol. 5, p. 283 (May) 1921) much of the verbal rubbish that goes under the designation of the endocrinology of the suprarenals. There is something stinging, yet deserved in its implied rebukes, in the words of Dr. Stewart: "On the whole," he says, "it must be granted that hitherto the attempts made to evoke in animals a well marked syndrome characteristic of adrenal deficiency have been singularly disappointing. The contrast is great when we leave this desert, where the physiologists and experimental pathologists have wandered, striking many rocks but finding few springs, and pass into the exuberant land of clinical endocrinology flowing with blandest milk and honey, almost suspiciously sweet." How much longer will the medical profession continue to merit such criticism? Just so long as the profession continues to give serious consideration to pseudoscientific rubbish promulgated by the exploiters of organic extracts (Jour. A. M. A., June 11, 1921, p. 1685).

## BOOK REVIEWS

**THE STORY OF THE AMERICAN RED CROSS IN ITALY.** Charles M. Bakewell. The MacMillan Co. 1920.

"The purpose of this book is not to give a detailed statistical account of Red Cross activities in Italy, that may be found in various Department Reports, but rather to tell the American people who contributed so generously to the Red Cross funds the simple tale of what their dollars did in Italy. It is a great and inspiring record and one in which Americans may well take pride."

The foregoing quoted from the Introduction of this book is a very excellent review of this interesting volume.

Read it and know the American Red Cross thoroughly.

EVERETT K. GEER.

**ELECTRO-THERAPEUTICS FOR PRACTITIONERS.** F. Howard Humphris. Oxford Medical Publications. 1921. Second Edition.

The second edition of this work has been entirely revised and partially rewritten making it half as large again as the first edition.

The author claims not to be offering a text book, but rather some systematized information based on personal observation as to the conditions amenable to electro-therapy.

For so small a book it seems quite complete.

EVERETT K. GEER.

**CHEMICAL PHARMACOLOGY.** Hugh McGuigan, Ph. D. P. Blakiston's Son & Co. 1921. \$4.00.

This is an elementary treatise for under-graduates particularly and dwells upon pharmacology emphasizing the chemical side. The author believes the chemical aspect should receive more attention in the teaching of pharmacology and offers the book to that end.

EVERETT K. GEER.

**FRENCH-ENGLISH MEDICAL DICTIONARY.** Alfred Gordon, A. M. M. B. (Paris). P. Blakiston's Son and Co. 1921. \$3.50.

This seems to be a very complete dictionary and will be welcomed by the many whose interest in French medicine was stimulated by the War.

EVERETT K. GEER.

**HYGIENE OF COMMUNICABLE DISEASES.** Francis M. Munson. Mr. Paul B. Hoeber. New York. 1920. \$5.50.

This "a handbook for sanitarians, medical officers of the army and navy and general practitioners."

It presents clearly and concisely what is known today regarding the epidemiology and management of the communicable diseases.

The various subjects are well arranged and ably presented.

EVERETT K. GEER.

**PRACTICAL DIETETICS.** Alida Frances Pattee.

A. F. Pattee, Publisher. 1920. Price \$2.25.

This is the thirteenth edition of a most valuable work. It incorporates the latest results of research in dietetics and the latest diets of leading physicians and hospitals. No hospital should be without this volume. Every physician would profit greatly by reading it

EVERETT K. GEER.

**MEDICAL NOTES.** Sir John Horder. Oxford University Press. 1920.

A handbook of one hundred and twelve pages which contains the remarks the author let fall in the Out-patient room and wards of St. Bartholomew's Hospital, London. The notes have been arranged under sixteen heads and are brief, succinct observations on conditions which the practitioner sees commonly.

The book is easily read and very worth while the reading.

EVERETT K. GEER.

**A PRIMER FOR DIABETIC PATIENTS.** Russel M.

Wilder, Ph. D., M. D., Mary A. Foley, Dais; Ellithorpe. W. B. Saunders Co. 1921.

This is a handbook of seventy-five pages containing a brief outline of the principles of diabetic treatment, sample menus, recipes and food tables.

It is written for laymen in easily understood terms and should prove to be a very valuable adjunct in the education of diabetic patients.

EVERETT K. GEER.

**MASSAGE AND EXERCISES COMBINED.** Albrecht

Jensen. Published by the author. New York City. 1920.

In his small volume of ninety-three pages the author presents a "novel method of real scientific movements combined with exercises, so that the benefits of both may be obtained simultaneously."

The exercises are intended for use in the home, no gymnastic equipment being necessary.

The average practitioner uses massage too seldom and thereby fails to employ a valuable therapeutic measure.

This volume should stimulate a new interest in massage movements combined with exercise.

EVERETT K. GEER.

**AMERICAN RED CROSS WORK AMONG THE FRENCH PEOPLE.** Fisher Ames, Jr. The Macmillan Company. 1921. \$2.00.

This is another volume dealing with Red Cross activities with the purpose of acquainting the American people more thoroughly with the broad scope of Red Cross efforts.

It deals more particularly with civilian relief work in France, a chapter not so widely known in this country as the work done among the military forces abroad.

EVERETT K. GEER.

**FEEBLENESS OF GROWTH AND CONGENITAL DWARFISM.** Murk Jansen (Holland). Oxford Medical Publications. 1921.

This is an exceedingly interesting work. It gives the result of studying the manner in which injurious influences will affect the growth of the individual.

This research attempts to work out two principles which the author enunciated in studying the nature and cause of "achondroplasia" viz:

"(1) Injurious agents affecting growing cell groups enfeeble their power of growth.

"(2) The measure in which growth is enfeebled is proportional to the rapidity of growth."

The book should be of prime interest to the orthopedist as it earnestly tries to display law and rules by which a large number of deformities are determined, and in some cases the means by which they may be forestalled.

Intensely interesting and worth while.

EVERETT K. GEER.

**TREATISE ON PHARMACY.** Chas. Caspar, Jr. Lea and Febiger. Sixth Edition. 1920. \$8.00.

This is a standard text book on pharmacy for students and pharmacists.

The present volume is the sixth edition, having been thoroughly revised.

It is not intended as a substitute for the Pharmacopoeia and National Formulary, but serves as a guide for the intelligent use of them.

The work is quite complete.

EVERETT K. GEER.

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WANTED—Location, Contract practice or position as an assistant; Graduate A school; married; age 31; 2 years hospital; 22 months government service; best references; available Sept. 1st.

Address B24 Care Minnesota Medicine.



# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association*

VOL. IV

SEPTEMBER, 1921

No. 9

## ORIGINAL ARTICLES

### CONTINUATION STUDY FOR PRACTITIONERS. THE OUTLYING HOSPITAL AS A STUDY AND TEACHING CENTER\*

JOHN M. DODSON, M. D.

Dean of the Medical School, University of Chicago.  
*Chicago, Ill.*

The field of medicine is so vast and progress in the medical sciences so rapid and continuous that a physician must be an earnest student every day of his active life if he is to render his patients that service which modern medicine makes possible and which they have a right to expect.

Much of this study is accomplished by the diligent reading of medical journals and books;—the physician, too, finds aid and stimulus in discussion and conference with fellow physicians in society meetings.

But these methods do not alone suffice. He must, at intervals, withdraw from the distractions of his routine practice, and devote himself intensively for a few weeks or months to the systematic study of the medical sciences and their application to the practice of medicine.

It was the recognition of this need by many physicians and their demand for suitable opportunities for such study, that led some of the medical colleges forty years ago to institute lecture courses for practitioners of medicine, given, usually, after the close of the regular winter courses for undergraduates. This movement was followed by the organization of Postgraduate or Policlinic schools of medicine in several of the larger cities where

clinical material, in hospitals and dispensaries, was ample for the only kind of instruction then in vogue. These schools have continued during the past 35 years and have increased to the number of 14 or 15. For the last few years their students have been, in large part, physicians who wished to qualify, in a few weeks, course, for the practice of some specialty,—conspicuously, Oto-Laryngology and Ophthalmology. Some of the undergraduate medical schools have continued to offer special courses for practitioners, usually for a few weeks in the spring or summer, but most of them, finding their resources taxed to the limit by their undergraduate students, have given up the effort to make special provision for physicians.

The opportunities offered for continuation study of this sort have always been inadequate and unsatisfactory both in kind and amount. Previous to the outbreak of the World War the more ambitious physicians sought such opportunities abroad. This inadequacy of resources for postgraduate medical study was strongly emphasized at the close of the War. Many doctors, returning home from the service, and desiring to equip themselves more thoroughly for return to private practice, found it impossible to secure the opportunities which they sought. It will be a long time, moreover, before European schools will again be able to give such instruction as they offered previous to 1914.

On the other hand, it is quite certain that we have in our own country ample material and a sufficient number of competent instructors in the many and rapidly increasing number of well-manned, well-equipped hospitals. It is necessary only to organize these hospitals as continuation study centers for physicians.

The physicians who seek postgraduate work may be most conveniently classified in three groups—(1) Those seeking facilities for ad-

\*Presented before the annual meeting of the Northern Minnesota Medical Association, Detroit, Minn., May, 1921.

vanced and research work as graduate students in the accepted university sense: (2) Those desiring to fit themselves, adequately, for the practice of a specialty and (3) Those who expect to remain in general practice but seek to refresh their knowledge of the old, and to acquire knowledge of the newer facts and methods in medicine.

The first group can find, with rare exceptions, suitable provision only in a University graduate or medical school, or, if sufficiently competent and well-prepared, in one of the independent institutions devoted to medical research, although it is hardly necessary to remark that a good deal of admirable research is being carried on in detached hospitals by members of their staffs.

It may be said of this group that the number is small, though happily increasing and that the demand for such workers far exceeds the supply. There is ample room for all who are competent in the existing University Schools. These institutions have many applications from would-be investigators who lack the necessary training and qualifications for such work.

The second, or specialist group, as yet has numbered too few physicians who are willing to devote the necessary time and effort to fit themselves thoroughly for special practice. One of the most vicious of the sins which have been perpetrated in the name of medical education has been that of the so-called polyclinic and postgraduate medical schools in offering courses of six to twelve weeks (sometimes as brief as three) in preparation for specialism. Such courses rarely make any pretense to do more than teach operative technique. The very much more important matter of a thorough education in the pathology, diagnosis and the relationship of the disease of the parts involved in the particular specialty has been almost wholly neglected.

Adequate training for any of the special branches cannot be accomplished in less than two years—better three—of exclusive devotion to the subject under competent instructors with ample material and equipment. The number of persons needed annually to supply the ranks of specialism is not large—probably not over 500 or 600 in all,—if we exclude Preventive or State Medicine,—and provision can

be made for the education of this group in the better equipped medical schools and the polyclinics, provided the latter are completely reorganized on correct lines.

In this connection it should be said that altogether the most adequate and satisfactory plan of education for special practice is that now in operation in the graduate school of the University of Minnesota and the Mayo Clinic. The generous endowment of the Mayo Foundation has made it possible to establish fellowships with a living stipend, so that the fellows can be selected without reference to their financial circumstances, but solely on the ground of merit.

The problem of making suitable provision for the education of specialists has been the subject of exhaustive study by the Council on Medical Education and Hospitals of the American Medical Association and was the theme of the annual conference held in Chicago last March. Many important contributions have been made to these discussions and this problem seems to be fairly on the way to a satisfactory solution.

There remains the third, or general practitioner group, many times the largest and in many ways the most important. If the university medical and graduate schools, the Research Foundations and the reorganized polyclinic schools take care of the graduate students and the specialist types of training, as well as of the education of the undergraduate medical students, they have, for a long time to come, all that they can effectively accomplish. As Dr Wilbur, President of the University of California has said,—“If these institutions do the work which they are now doing, the medical profession must itself provide the facilities for continuation study for the general practitioner in hospitals not as yet engaged in teaching. Indeed the medical schools are already so overtaxed with the instruction of undergraduates that the teachers of the fundamental branches have declared with emphasis that they cannot undertake to give instruction in these subjects to physicians fitting themselves for special lines of practice. It will be necessary to appoint special instructors for this purpose, probably for the most part, from younger men in the special departments of these schools.”

To meet the demand of the general practi-



tioner in providing facilities for continuation study or "brushing up" courses in the several medical branches, the organization of the outlying hospitals is the only solution now apparent and is one of the most important problems confronting the medical profession. It demands, first of all, a more thorough and comprehensive survey of the hospitals of this country than has yet been made, and a general elevation of the standards of hospital practice.

What sort of opportunities should be afforded the general practitioner by such a teaching or study center? That, of course depends on what the average doctor needs and seeks in such continuation study.

*First* of all, he needs opportunity for review of the fundamental medical sciences and for study of the newer facts and methods as much or more than he needs work in the clinical branches. The physician who has not at his command a reasonably accurate and thorough knowledge of anatomy, both gross and microscopic, of embryology, neurology, physiology, biologic chemistry, pharmacology, bacteriology and pathology is not equipped for the efficient practice of his profession. Moreover, it is these branches which are so easily forgotten and a knowledge of which it is so difficult to keep fresh and up-to-date through mere reading of journals and books by one's self. One needs the stimulus and helpful aid of fellow students, competent instructors, and first hand contact with material.

*Second*—He needs practical and laboratory work under supervision and, in connection with these, access to a library rather than didactic lectures, quizzes or even clinics, if one means by that, as is usually meant, the presentation of patients or the performance of operations in an arena before large groups.

*Third*—In the clinical subjects he does *not* need training in the technique of major operations in surgery or any of the surgical specialties, aside from that which will enable him to handle surgical emergencies. Note that we are here discussing continuation work for the general practitioner—the family doctor,—who has no thought of becoming a "specialist,"—that is, of limiting himself in the future to the practice of a single department of medicine; but who expects to return to a life of general

practice. Such a physician has no moral right to attempt major operations, demanding comprehensive pathologic and diagnostic knowledge and great technical facility which can be secured only by exclusive devotion to a limited field of medicine. When a general practitioner has satisfied himself that a major operation is necessary in a given case—not one of emergency,—he must, if he is an honest, properly minded doctor, ask himself this question: "If this patient were my wife, my daughter, my mother, my son,—or any one near and dear to me, would I (aside from any handicap of personal emotion) choose myself as the best person available to do that operation?" With rare exceptions, the answer to that question must be in the negative, for the family doctor, who has opportunity to do such an operation but once, twice or at the most a few times in a year cannot possibly attain to that degree of accuracy in diagnosis, perfection of technique and ability to cope with unexpected complications and contingencies which alone make surgical work reasonably safe and successful.

It is true that the economic pressure on the general practitioner is, in our day, tremendous,—the temptation to undertake major surgical operations for the fees to be had, very great, and the exasperation on witnessing the collection of a fee by the surgeon, for a few minutes of work—several times that of the attending physician for many days or weeks of service—well nigh insupportable. But these considerations are no warrant whatsoever for subjecting a patient to a serious operation by unskilled hands, sacrificing his health and often his life. The marvelous accomplishments of modern surgery rest primarily on the discovery of the facts about wound infections by Pasteur, and the development of clean surgery by Lister and his followers. But a chief factor in these accomplishments is the experience and skill attained by men who rigidly limit their activities to the field of surgical work in some particular line. Specialists have not taken from the general practitioner work which he had before, but specialism has made it possible to give help to the sick in ways and by means which did not before exist. On the other hand, specialism is responsible for an enormous number of needless, unjustifiable and often mutilating

operations. One of the chief functions of the family doctor is to guard his patients against the biased, unwise insistence of the specialist who urges an operation which is not indicated. The final decision as to whether or not an operation should be performed in a given case, should rest with the family doctor.

It is true that the work falling to the family doctor has been greatly curtailed in the last 30 or 40 years by the great accomplishments of preventive medicine and in part by the perfection of surgical procedures which restore promptly to health patients who formerly had to endure long continued and sometimes permanent invalidism. It is likewise true that the sources of revenue of the family doctor have been markedly lessened. He has good reason to feel that the great discrepancy between his fees and those commanded by the specialist, is unjust. But the remedy for this does not lie in his undertaking work for which he is not trained nor in the secret dishonest splitting of fees with the surgeon. He must restrict his work to those functions which he is competent to perform.

Incidentally may I here remark that I question seriously whether the family doctor will not, in the future, find his greatest usefulness in the field of preventive medicine, as the health adviser of his clientele, receiving his major compensation in the form of annual fees for keeping his patients well.

Pardon this digression, but in a discussion of what the general practitioner needs and is to seek in such Continuation Study Centers as are here described, it is essential to know just what type of work he is fitting himself for.

*Fourth*—These practitioners must have courses so arranged that they may be covered by intensive work in short periods, as contrasted with those offered in the undergraduate medical school. They must be long enough really to accomplish something worth while,—certainly not less than six weeks, much better three months—but few physicians will feel able to remain longer away from their practice than six months.

What are the essential features which a hospital should possess in order to meet these needs of the general practitioner?

It must have, *first*, the material equipment of

good laboratories, with a competent pathologist in charge, an x-ray equipment with a capable roentgenologist and a sufficient number of patients, especially in the medical group.

*Second*, it must have an organized responsible staff of capable physicians, willing to devote the necessary time and attention to the supervision of these practitioner students.

*Third*, it must have a good library, well equipped with the better medical journals and the standard modern medical monographs. It is a great advantage to have a competent librarian, familiar with the library, on hand, at least, for a few hours each day, preferably in the evening.

*Fourth*, a definite schedule of work for each student should be arranged by an administrative officer,—call him dean, registrar, secretary, director, or what you will,—so that each practitioner student may know where he is to be and what he is to do every hour of the day, and thus avoid waste of time.

For the matter of the fundamental medical sciences, some member of the staff, preferably one of the younger surgeons must be willing to keep his knowledge of anatomy fresh and up to date, and to direct the work of these post-graduate students in this subject. As to material for this study,—with anatomy acts on the statute books of most of the States it should not be impossible to secure an occasional cadaver for dissection and for work in operative surgery on the cadaver. Possibly for most practitioners actual dissection may not be desired but rather a study of carefully dissected parts. The modern methods of preservation of such material with glycerine, phenol and alcohol, and their subsequent immersion in liquid petrolatum, as suggested by Professor Meyer of California, make indefinite preservation possible. With these dissected parts, cross sections preserved in formalin, wax and *papier mache* models, skeletons, articulated and disarticulated, good anatomical atlases and text books, the student can review his anatomy very satisfactorily. Instruction in histology, embryology and neurology may be undertaken by the same or some other members of the surgical staff and the necessary microscopic slides, models and other illustrative material can be accumulated without serious difficulty.



That the undertaking of such instruction by members of the surgical staff will be of the greatest possible advantage to them in their own work, goes without saying. And, further there is distinct advantage in having the supervision of such work in the hands of a surgeon who is a daily student of living anatomy in his operative work. Living anatomy is quite a different thing from the anatomy of the dead body, and, needless to say much more important for the physician.

Similarly some internist on the staff should give instruction in physiology and another in biologic chemistry and in these branches the instruction should be, in so far as possible, of the laboratory sort, where the student does his own experimenting and has first hand contact with apparatus and materials. For example, when the sphygmomanometer was first made available for use by the general practitioner, how readily one might have secured a knowledge of the physiology of blood pressure, of its diagnostic significance and of the mechanism and methods of use of the several types of blood pressure apparatus in a brief course of demonstration and actual practice in a hospital. More recently, the method of determining metabolism rate by the estimation of oxygen consumption, as elaborated by Benedict and others, has been so simplified as to be available at any bedside or in any office.

The determination of renal insufficiency by the estimation of phenol-phthalein elimination is not beyond the accomplishment of the general practitioner, nor, likewise, the quantitative determination of sugar elimination and that of the acetone bodies in diabetes.

The study of bacteriologic procedures such as the detection of pathogenic microorganisms in the secretions from throat, nose and ear, the vagina or from wounds, in the urine and spinal fluid, the chemical examination of the urine, the routine examination of the blood including the counting of blood corpuscles, estimation of hemoglobin, differential count of leucocytes, and even blood cultures, as well as the examination of feces, for occult blood, the ova of parasites and other pathologic items, are all within the scope of the family doctor if he only have sufficient knowledge and training. Instruction in these matters falls naturally to the hospital

pathologist who must be on a full or part time basis, not only for the efficient instruction of such students, but as well for thorough clinical work in the hospital. Laboratories for clinical diagnosis, State, County, Municipal and private, now undertake such procedure for physicians who have access to them, but many family doctors have not, and for these the only recourse is to undertake these laboratory procedures themselves. Each physician must decide for himself what of these laboratory methods are within the scope of his equipment, time and ability but he cannot safely leave them to an office attendant, having no general medical training, but only a brief course in laboratory technique at some polyclinic where such courses are given. The custom of sending an office attendant to take such a brief course in technique and subsequently relying on her findings for a diagnosis has spread rather rapidly in the past few years, and, as often practiced, is thoroughly bad. It is helpful and proper for the physician to have the assistance of such an attendant in preparing some of the materials for such laboratory procedures, but the examination of the end results he should make himself and he can safely arrive at a diagnosis only by considering these laboratory findings in connection with the clinical history and physical findings at the bedside.

Every physician should learn how to perform an autopsy, and a practical course in post-mortem technique should be offered by the hospital pathologist. One of the principal defects in the training of the average American physician has been neglect of pathology, and especially of that very important aspect of pathology, pathologic anatomy. No conscientious, capable physician ever neglects to secure an autopsy on one of his patients who has died, if it is possible to secure such. The prejudice which is quite general in this country against post-mortem examinations, is in striking contrast to the universal consent and request for such examination in some foreign countries. This prejudice can never be overcome except by the education of the public to the importance of such procedure in unravelling the mysteries of disease and in educating the physician. It is noteworthy that some physicians are almost uniformly successful in securing the consent of relatives and

friends to autopsies. What some doctors do others can do by the exercise of proper tact and persistence. The physician is much more likely to make such a request and to secure consent if he has had practice in making autopsies and feels that he can expose and examine the tissues and organs properly and thoroughly, and is competent to recognize the pathologic changes which are disclosed. He should at least be able to remove the organs by methods such as that recently described by Dr. Le Count, so as not to obscure the changes which have occurred as the result of illness, in order that when these are properly preserved and forwarded to an expert pathologist he may be able to determine all of the pathologic changes which have occurred. Such knowledge is of vital importance in medico-legal cases.

Coming now to the clinical branches certain matters are fundamental to the efficient practice of them all, and the first of these is that of clinical history writing. Accurate, thorough, and comprehensive clinical records of every patient are a *sine qua non* for good practice. The presence or absence of such records is the very best criterion of the kind of work which is being done in a hospital and they are quite as essential in house to house practice. And yet it is deplorable how few physicians keep such records. Instruction in the writing of case histories is one of the most important courses which the hospital can offer to the general practitioner. The course need occupy but a few hours. The task of writing the anamnesis can be lessened by the use of abbreviations although it still remains for some one to devise a list of such abbreviations for universal adoption.

In the subsequent daily record of the patient's progress some plan of making all entries on the temperature chart by signs and abbreviations with occasional foot notes, such as has been suggested by Hess and others, makes for time saving both in the entering and subsequent reading of the clinical history. In such a plan entries of facts observed such as pulse, respiration, weight, findings of blood, urine, stools and the like are entered above the base line of normal temperature while things done for the patient, medicine given, baths, changes of diet

etc., are entered below the line, using foot notes where necessary.

Physical examination is likewise an imperative essential for every physician, specialist or otherwise. In this art it is quite likely that many family doctors are more proficient than their hospital confreres, excepting the internists, but opportunity to practice the methods of physical diagnosis under the supervision of an internist who is an expert should add to the physician's skill and acuteness and make him more certain of his findings. It should be emphasized, especially to the younger physicians that physical examination by the unaided senses is still, with an exhaustive, accurate case history, the main pillar of diagnosis, and an art that needs to be diligently cultivated. The inclination to magnify the laboratory and x-ray findings and the other refinements of diagnosis has grown of late years and needs to be strongly combated.

In internal medicine the diseases and conditions which especially interest the practitioner student are so numerous and varied that it is impossible and unnecessary to enumerate them in such a discussion as this. What the particular students may observe at any particular time depends largely on what clinical material is available in the hospital where they are at work. The opportunity to study with the clinician, patients in the wards and the out patient department, to observe his methods of procedure, to have first hand study of these cases under his supervision, aided by the findings of the several specialists whose assistance may be invoked and then to round up all the findings in a critical, final diagnosis: this is the real need of the practitioner as it is of the undergraduate student.

In pediatrics the outstanding topics are infant feeding with emphasis on the enormous advantage of breast as contrasted with artificial feeding, the care of the normal infant and the instruction of the mother by methods of infant welfare clinic, and the study, where clinical material is available, of the communicable diseases, with special reference to their early diagnosis and the prevention of their spread.

The infant welfare clinic, as conducted for



the poor has been such a tremendous factor in lessening infant mortality that its methods are being more and more adopted in private practice, mothers of well-to-do families bringing their infants to the physician at regular intervals for observation and for instruction in their proper care. This is preventive medicine of the best sort and yields as it should, a considerable income to the family doctor who educates his clientele to pursue this policy.

The psychiatrist or neurologist on the staff should offer courses in the diagnosis and management of insanity, wherever clinical material for this purpose is available in public or private institutions for the mentally afflicted. Very few physicians indeed have had any education of moment along the line of insanity. Every general practitioner should at least be able to make a tentative diagnosis of the type of insanity present in a given case, to advise as to the need of institutional care and to recommend the best institution available for that patient.

Surgery and the surgical specialties, gynecology, orthopedics, genito-urinary, oto-laryngology, ophthalmology, etc., have heretofore offered the major portion of the courses given at the polielinic and postgraduate schools, and yet these branches, as they have usually been taught, are of the least importance to the family doctor. He does need the surgery of emergencies, fractures, dislocations, cutting, lacerating and crushing injuries and the infections which may complicate them, as well as the surgery of acute strangulated hernia, and acute appendicitis with threatened rupture. Thorough training along these lines with frequent refreshing and renewal of his knowledge of anatomy is of importance for two reasons,—(1) Emergency surgery is the one kind of surgery which he cannot escape and which alone, therefore, he is justified in doing, and (2) it demands surgical knowledge which he must have at instant command. He cannot set the operation for a week or ten days in the future and then proceed to fortify himself by reading up his anatomical and surgical text-books or by practicing the operation on cadaver or on animals. The life of the patient or at least his future health and the usefulness of the injured members, hinges often on what is done by the physician within a brief period! immediately

following his first sight of the patient. He must have also a highly developed "aseptic conscience" and a command of the aseptic technique which is never perfect until it has become a fixed habit, so that the several steps in the process are automatic.

His desire to see major operations,—not of emergency type, and to observe the results of such operations in the relief and cure of the conditions for which they are done, is natural and proper, but any attempt to instruct him in the technique of such procedure is time worse than wasted, as has already been emphasized. In the matter of the surgery of accidents which is so essential, the railway and industrial hospitals present especially good opportunities.

Courses of instruction in the surgery of special parts, such as on the tonsils, nasal septum, turbinates and sinuses, on the mastoid or other portions of the ear,—on the eye, the pelvic viscera and on the genito-urinary tract,—ought not to be offered at all to the general practitioner; but the pathology of surgical conditions of these organs and the relation of their disorders to disturbances of the general economy are important matters of knowledge for every physician.

Finally, thorough training in obstetrics, with especial emphasis on the aseptic management of labor, is a vitally important element of the education of the family doctor on whom must devolve the care of the vast majority of women in pregnancy and labor. Few hospitals at present have maternity departments and for some time to come the facilities for obstetrical teaching will be woefully inadequate for the practitioner. Fortunately the knowledge that, with modern clean methods of midwifery, the hospital is the safest, most economical and best place for confinement is gaining ground in the public mind, and there is reason to hope that before long the clinical opportunities for obstetrical teaching will be much increased.

Enough has been said to indicate what provision should be made by a hospital in order that it may become a satisfactory center for the Continuation Study of Medicine by the practitioner.

If one may judge from the type of courses heretofore offered by the polielinic or post-

graduate medical schools and sought by their students, the demand from many physicians is for a kind of work not here recommended. It is, however, an essential function of such a study center to direct its students into proper lines,—to offer them courses of instruction which will make them more efficient, trustworthy general practitioners, and to discourage them in every possible way from the ambition to become made-while-you-wait specialists.

One of the best opportunities which the smaller hospitals can offer for training is service as a resident or assistant physician in which the duties will be essentially those of an interne. This plan will serve a double purpose, opportunity for the student practitioner and interne service to the hospital which in many institutions can be obtained in no other way. The demand for internes each year by the hospitals in the United States is now nearly double the total number of students graduated by all the medical colleges of the country. This discrepancy is certain to increase because the number of hospitals is growing rapidly while the number of medical graduates, which should be limited by the real need for physicians, ought not to increase for some years to come. In this emergency the appointment of physicians, seeking further opportunity for intensive study, seems one of the best means of supplying the demand. Their terms of service will be more brief than that of the student just graduated,—usually three to six months. On the other hand they are much better prepared, as a rule, by the experience gained in private practice to perform the duties required in such service.

Frequent meetings and conferences of the medical staff should be held in which the internes and student practitioners participate. They should occur at least as often as once a week, taking up for discussion cases of special interest, demonstrating pathologic specimens from autopsy or operation, with occasional papers from the students in which the literature of some disease which has been observed in the hospital by the student, has been worked up and analyzed.

Should tuition fees be charged for such continuation courses? This it seems to me, is a

question which must be decided by each hospital which organizes itself for such work, and the decision will vary with local conditions. A practitioner for example serving as a resident or interne gives ample return for his opportunities. In a health center hospital, erected and maintained by the community, as are those in Iowa, the opportunities for postgraduate study belong by right to the physicians in that region.

No diploma or gaudily engrossed certificate should be given to a physician student who has completed a term of study, but a simple straightforward statement of just what he has accomplished, setting forth the dates of beginning and ending of his term of study, may be given him, signed by the proper officers of the medical staff.

It would be of advantage in my judgment, if outlying hospitals organized into such study centers, could be affiliated or associated in some way with a University Medical School, not too far away, and the latter institution should offer courses, or at least provide for occasional conference, on medical pedagogies and administration, attended by the staff members of the outlying hospitals.

What hospitals in the United States are fit to undertake work of the sort we have been discussing? This question involves so wide and intimate a knowledge of the character, equipment, and above all, of the personnel of the staffs of our many hospitals, that no individual or organization is at present prepared to give a complete and satisfactory reply.

The surveys which have been made by the Council on Medical Education of the American Medical Association, by the American College of Surgeons, by some of the State Boards of Medical Examiners, conspicuously that of Pennsylvania, and by a number of the Medical Schools which now require the completion of an interne year in an "approved" hospital as a prerequisite for graduation, have all been helpful and they have accumulated a large amount of information.

Each of these surveys, however, has been conducted for some special purpose, and not one of them has been adequate and comprehensive even for the hospitals visited.

There is an acute need for a single, unified, comprehensive survey of the hospitals of the



United States conducted by groups of investigators in each of which groups all of the important interests involved in a modern hospital are represented by persons each of whom is competent to judge of the efficiency of the hospital in his particular field. Such a survey and listing of hospitals is needed by (1) the medical school requiring the interne year, (2) the State Boards which require the completion of an interne year as a prerequisite for licensure, (3) by the nurses, organizations and examining boards in states where registered nurses are licensed, (4) by hospital associations and many other interests which desire to know of the efficiency of the management and economic conduct of the hospitals, (5) by the organizations of hospital social workers, a feature of hospital activity becoming more and more important, (6) last but not least, by the many industrial and manufacturing concerns, especially in States where Workmen's Compensation or Employer's Liability statutes are in force, who have daily occasion to send their injured employes to hospitals.

Such a nation wide survey can be accomplished only by dividing the country into zones, each having such a number of hospitals as can be adequately surveyed in a reasonable period of time by a group or commission.

Each group should include a person (1) familiar with hospital management such as a hospital superintendent of experience, (2) one familiar with nursing and nursing education, (3) a physician or medical educator competent to judge of interne service and the education of the interne, (4) if possible, a social service worker and (5) possibly another physician who will devote himself especially to an inquiry into the character and competence of the medical staff.

Such a survey will be an undertaking of magnitude, difficult, and expensive, but an accurate, thorough and comprehensive knowledge of the many hospitals in this country is such an imperative and immediate need to many interests, that it should be undertaken.

The one organization that is best fitted to undertake such a survey and listing of hospitals is the American Conference on Hospital Service, which is made up of delegates from the National Associations representing the several phases of hospital work. It is hoped that such

a survey can be undertaken in the near future.

Meanwhile any hospital of 100 or more beds, (there are at least 400 general hospitals of this size, in the United States not now engaged in teaching) well organized and equipped, with an earnest, competent medical staff, ought to offer its advantages as a teaching and study center to the physicians in its vicinity. Its organization as such a center will not only greatly enlarge its field of usefulness but is more certain than any other step to improve the service which it renders to the patients who resort to it, and to make the members of its medical staff more studious, alert, scientific and capable physicians.

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## RADIUM; ITS THERAPEUTIC USES IN SURGERY\*

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Radium is still rarely discussed before general medical meetings. One is therefore tempted to make a few general remarks concerning the strange and previously unheard of qualities of this substance which has revolutionized our conception of matter, revolutionized geological theories and astronomical views, and by its action upon living tissues has become of great importance to the botanist, the biologist and the physician.

If you remember that radium gives off energy day and night for months and years and centuries, until at the end of seventeen centuries this energy is decreased to half and after another seventeen centuries to one quarter of the original constant flow of energy, if you further consider that this energy is equal to heating its own weight of water from the freezing point to boiling every three quarters of an hour day and night year in year out for all these centuries, we stand indeed before bewildering phenomena. And if a physicist calculates that the energy embodied in an ounce of radium and gradually given off during the course of disintegration into another element, probably lead, is enough to lift one hundred of the largest battleships afloat entirely out of the water, we

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recognize that we are dealing with a power all of its own.

A few general remarks seem desirable, though I am in danger of dwelling too long upon the physical qualities of radium. This substance emits its gamma rays of a power of penetration that the hardest roentgen rays, so far produced, can not nearly equal. If we wanted to equal the penetrating power of the gamma rays of radium with the roentgen tube, the spark gap, instead of ten inches as now used for deep x-ray therapy, would have to be from eight to fifteen feet. For deep x-ray therapy the softer rays are of no use and only detrimental. The hard x-rays will be half absorbed after going through 5 cm. of soft tissue, while the gamma rays penetrate 26.5 cm. before being reduced to half strength. Ten cm. (equal to four inches) below the surface of the body the hard x-rays coming from 8 inch skin distance are reduced according to C. H. Viol, to one ninth of the surface intensity for the same square surface. To get the effect of an erythema dose at this depth i. e. the dose which the skin can stand with impunity at one session, we would have to torture the skin with nine times the maximum allowable dose. All this is mentioned only to illustrate the superiority of the radium gamma ray over the best available roentgen ray. If at 26.5 cm. we still get half intensity of our rays, it becomes at once clear that we may have very effective cross firing through chest and abdomen from all sides. The different tissues withstand the radium application in different degrees. If we put an average skin resistance at 100, the scalp can stand 125, the bladder 25, the rectum 20, the urethra 10, while the uterine wall could be put at 300.

The uterus is thus a favorable area for the treatment of its tumors, and here indeed did we see the first striking results. I have observed cessation of profuse menorrhagia in uterine fibroid and an almost complete disappearance of the fibroid itself which was the size of a three months' pregnancy, after one 24 hours application of 50 milligrammes of radium element. And the radium was only applied vaginally. I have not used the radium in fibroids larger than a uterus 4 month pregnant. The generally accepted technic is the intra-uterine application of radium in these cases. I

have persisted in the simple vaginal introduction combined with external application over the lower abdomen. Unless there are complications like inflammatory changes of the adnexa or similar special reasons, we prefer radium to operations in the moderate sized fibroids.

In simple uterine bleeding, meno- or metrorrhagic a diagnostic curettage should be made in all cases. Intra-uterine application of radium can be combined at once, or the radium may be introduced vaginally. In intra-uterine application nausea may be severe, a watery discharge may follow the treatment at times for even months, and if even very slight and quite old inflammatory residues exist in the adnexa, intra-uterine radium treatment is a mistake which revenges itself most unpleasantly. It is necessary to tell the patients beforehand of the possible sequelae, especially of nervous symptoms in case a suppression of the menses is strived at, otherwise a sense of disappointment multiplies the regular menopause molimina, and the product is charged to your medication.

The most glorious results of radium therapy are seen in inoperable carcinoma of the uterus. Even badly advanced cervix carcinomas with involvement of the vagina forming foul ulcerated craters quite commonly improve so much that those practitioners and surgeons who have not seen this improvement before, are often not only elated but perplexed. Right here a word of warning is apropos. First of all the observations are not yet of many years' standing, though Heyman of Stockholm had in 66 cases 28.8 per cent cures after 5 years. If a return of the growth occurs, and some very experienced men do not dare hope for a permanent cure in these cases, there comes a time when radium has no further staying effect; the growth then runs wild. The primary results vary greatly. Some patients stand the treatment with the greatest impunity, others not, especially when the rectum is involved. A moderate encroachment of the bladder is already less disastrous in our experience, as these forms of carcinomata remain local growths for a longer time. Carcinoma of the body of the uterus has such good surgical prognosis that its treatment is operative. One case where operation was ruled out, is well so far, but only of recent date. Particularly



favorable cases for radium treatment are post-operative recurrences in the vagina. They may remain well. Even in other parts of the body these local implantations often seem to yield readily to radium, as after breast operations. One case of carcinoma of the alveolar process in which I made a resection of the upper jaw, had a recurrence in the wound of the incision of the cheek. It is now five and a half years since the operation and the patient, whom I met a short time ago, smoking a big cigar, is in splendid health.

Speaking of carcinoma of the upper jaw I have two cases which have been operated upon elsewhere, and came to me as inoperable, three and three and a half years ago respectively. as we have done for more than ten years, we first resected atypically extensively and then applied the hot soldering iron to the limit of permissibility. This was also done in the two cases called inoperable, and 5000 milligramme-hours of radium were given starting a week or so after the operation and giving the whole dose within a week if possible. Both cases are still well and very happy.

*Carcinoma of the tongue, palate, pharynx and mouth.* While writing this paper I have two patients in the hospital, who were both operated upon for carcinoma of the tongue. One had his operation a year ago. It was a carcinoma of the base of the tongue which we removed by a lateral submandibular incision. The tumor reached very close to the epiglottis. We removed the base of the tongue, going well beyond the midline and backward to the epiglottis removing even part of the mucosa covering the anterior surface of the epiglottis itself. Radium was placed into the bottom of the remainder of the tongue,—50 mgr. were left in place for 48 hours. This was a large dose, half of the amount used in full treatment of carcinoma of the uterus. We watched closely and with apprehension for possible sudden edema of the larynx, though the radium was placed as far from the epiglottis as feasible. No signs of choking occurred, but later on the wound gradually opened somewhat and now at the end of a year we put a pedunculated flap over the opening which was the size of an unpeeled almond, in the midst of which you could readily

see the epiglottis and the scary neighborhood of the base of the tongue.

The other mentioned case of carcinoma of the tongue, where we removed over half of the base together with the tonsil and its two pillars and the adjoining portion of the pharynx after splitting the lower jaw in the midline, had too extensive an operation to make it advisable to add possible shock of radium immediately. An operation for strangulated femoral hernia—due to the coughing—three days after the tongue operation made us wait two weeks with the insertion of the radium. This case ought to be a rather favorable one, as the forms of tongue carcinoma, where we do not have large fungating ulcerating surfaces but rather moderately ulcerated hard nodes, are much more favorable, especially if the microscopic picture does not prove it to be of squamous cell type with horny pearls. In these latter forms the radium is rather powerless. Carcinoma of the tongue and the floor of the mouth is one of the saddest chapters in surgery, and if radium should prove to be of benefit as it seems to be, it is a real blessing.

Endotheliomata and mixed tumors of the *parotid gland* are favorably influenced. Two of my cases are under complete control for 4 and 5 years, one of them after operative recurrence.

*Carcinomas of the pharynx and naso-pharynx* are as a rule favorably influenced. One case came to us in June 1919 with great dyspnea. A tumor of the size of a tangerine filled the back part of the mouth and pharynx. The patient was snorting with the mouth wide open. The first thing to do was a tracheotomy. Then plugging the entrance to the larynx we bluntly removed quickly the large mass from the posterior wall of the pharynx, inserted 50 mgr. of radium and packed tightly. The tumor had also filled the entire naso-pharynx. This patient surprised us with a complete freedom from recurrence after more than two years, when he came to town with his sick wife.

*Carcinoma of the thyroid.* Three cases of what seemed to be clinically and microscopically a struma proliferans of Langhans (a form of adenocarcinoma of a moderate malignancy) were extensively excised and strongly treated with radium. They are well, though operated

upon 6 and 7 years ago. I do however not feel quite certain as to the diagnosis. One case of an enormous carcinoma of the thyroid, over-reaching the sternum downward for 7 cm., could be only partly excised. This was done in January 1918. Radium was used in maximal doses. In the first four months after the operation the 72 year old lady, gained from 118 lbs. to 176 lbs. Two years after the operation the neck was quite small and, though there was a hard induration around the trachea, the general condition was very acceptable. Six months later the patient died from what appeared to be pulmonary metastases.

In another patient, a male, 45 years old, we made the diagnosis of struma maligna and excised the thyroid extensively, though not totally, in Nov. 1913. The tumor was somewhat larger than a man's fist and was situated in the left lobe. All was well then for two years, when he began to notice a renewed swelling. He did however not come back until March 1918, when I again found on the left side a fist sized tumor and a plum sized one low down on the right side. The left tumor was not movable upward and downward, and only very little sideways. We operated again, and had to resect the internal jugular vein for its whole length and two inches of the vagus nerve together with the tumor. About ten days after the operation we applied 3700 milligramme-hours of radium and six months later another 2500. During the year 1919 he had again twice radium, which held the growth in check, though it had made its appearance again. The last time he came for radium treatments was in August 1920. He was then in rather poor general condition.

I report some of these operations together with the radium treatment to emphasize the necessity of using the several procedures conjointly. To get the best results it is necessary that the surgeon know the possibilities of radium and that the radium therapist be in close touch with the surgeon.

In carcinoma of the esophagus the application must be made through the esophagoscope. Only temporary results can be expected here. Nevertheless we had at least one rather satisfactory temporary result. It was a man of about 45 years, who came to me January 1905 in

a most pitiable condition. For one week previously, only thin broth could be swallowed and for the last two days not even water. Even the finest esophageal sounds could not be passed beyond a point about 6 cm. above the cardiac end of the stomach. With the esophagoscope we found a strictured hard area at the place mentioned with raw hard edges, an ulcerated stricturing carcinoma of the lower end of the esophagus.

Fine silver-wire sounds could now be passed into the stomach with slight pressure. The stricture was about 6 cm. long. Unless one saw the narrow crater the probes would invariably be caught at the side of it. Dilatation then followed with gradually increasing sizes of the sounds, partly of olive shape. The effect upon the patient was marvelous. Even with what seemed to us a small opening he began to eat soft food to his heart's content and soon smilingly reported that he stole a piece of meat from his neighboring patient at the hospital, after which he was allowed to try all kinds of food.

Within three weeks he gained twenty-six pounds. In order to do as much as possible beyond a simple palliative measure, and to give the patient all possible chances and at least some reasonable hope, we started to use radium. A glass tube containing a few milligrams of radium bromide was sewed into a piece of linen, and the whole was fastened to a silk thread. It was attached to the end of a sound and inserted into the crater without any screening. It was allowed to remain there up to thirty minutes at a time, in all about six times. After a few months (in May, 1905) the patient was better in appearance, weight, strength, mental condition. Not even then, however, could I insert a tube or probe without the use of the esophagoscope. I imagine it did not find the hard rigid area, but got caught against a portion outside of this hard ring. This patient then felt so well for a long time that he thought he was cured, and notwithstanding my urging him to come at intervals to see me he did not show up any more. His difficulty re-appeared later, and he died about a year after his first visit to me. While the decided temporary result was apparently due to the mechanical dilatation, I cite this case



as it occurred one year before Bircher published his claim of being the first to use radium in esophagus cancer by esophagoscopy.

The maglinant tumors of the *mediastinum* are a most important field for the use of radium. They are mostly sarcomata and lymphosarcomata. For the present our only hope in nearly all of these cases lies in the roentgen rays and more especially in radium. Very large doses of radium with sufficient filtering to remove all but the hardest gamma rays seem necessary, according to Burnham of John Hopkins University who reports most remarkable results. He used only those radium rays which were left after filtering with 3 mm. of lead. If the radium can be introduced into the tumor mass, smaller quantities may be sufficient.

Permit me to report a case in this connection: On Feb. 21, 1917, a gentleman of 26 years consulted me for a mediastinal angiosarcoma. The clinical picture was typical. Our patient was cyanosed. His face was puffed up, the eyes glossy, the veins of the neck distended. Pain in the chest was complained of. A moderate but annoying dry cough existed; pulse 125, temperature 99 8/10°. For many weeks the patient had not been able to sleep in bed or to lie down on account of his dyspnea. Over the upper part of the sternal region there was a bulging, which was soft to the touch like an angioma. The diameter was about 10 cm. At the periphery you could see tortuous veins. On March 6th after some x-ray treatment we gave a few whiffs of ether in sitting posture, tied the peripheral blood vessels off by interrupted circumferential sutures, made a vertical incision down to the sternum, inserted the radium (50 mg.) into the wound, and immediately packed and compressed. The tendency to bleed was fearful, but compression and some clamps stopped it. The radium was left in only 7 hours. Four days later without anesthetic we made a groove into the manubrium sterni with Luer's rongeur shears. The bleeding forced us not to go farther. The radium was put into this sternal groove and left in for 23 hours. After this the patient felt easier, did not cough as much as before and began to sleep at night. On March 17th we went through the sternum and inserted the radium

into the retro-sternal tumor mass. The tendency to bleed was incomparably less than previously, especially than at the first incision. This time, and one week later, and again after another two weeks the radium was placed into the wound, each time for about 48 hours. In all the patient had 8600 milligram-hours. If we consider that this dose was given in the tumor, it is a very respectable dose and more than is usually given for instance in a carcinoma of the uterus. In addition we gave during that time (including two pre-operative treatments) five x-ray exposures (10 to 15 minutes, hard tube, with 3 mm. aluminum filter). Pain in the left shoulder was complained of for a while, but the general condition was greatly improved. The patient could sleep in his bed, up to eight hours in the night. He went to the theatre, traveled to his home and came back during the eight weeks he was under our care, and was most enthusiastic. Three months later, I was informed, that he succumbed to what was declared a pneumonia.

Carcinoma of the *breast*. We are of the impression that x-ray and radium have very materially improved the prognosis of our cases. We give pre-operative x-ray treatment for two days in order to stun the cells enough to make implantation less likely. Fat young women with soft fast growing carcinoma give a very bad prognosis, radium or no radium. The atrophic forms, which so often come late upon the operating table, and for this reason have greatly hurt or almost spoiled their operative chances, are definitely benefited by radium and x-ray. The treatment is not to necrose all carcinoma, but to increase the fibrotic strangling of the carcinoma nests. Even when the skin is perforated, healing may occur by patient use of moderate doses.

Carcinoma of the *bladder*, *prostate* and *rectum* may be greatly benefited by radium. The female bladder is more accessible of course. But by suprapubic incision we can use the hot iron and then put the radium into place. In malignant papilloma this has worked quite well in our hands. In carcinoma of the prostate we have laid bare this organ as for a perineal prostatectomy and then either applied or inserted the radium under bulky walling off of the rectum. The rectum, especially the lower

portion, does not stand radium well, and the patient complains bitterly of pain and tenesmus. Our procedure seemed therefore an improvement over the method of treatment, as advocated in the literature; but our experience in this field is quite limited.

Carcinoma of the rectum is more of a surgical possibility than that of bladder and prostate. The inoperable forms and the post-operative recurrences are relegated to the radium treatment. The circular carcinomata of the upper rectum are the most favorable for radium or any treatment, because they remain comparatively long rather localized. Carcinoma of the lower portion of the ampulla involving the sphincter area is the most dreaded by the surgeon. And just here I have a result which is worth mentioning. In November 1919 a lady 65 years old, was brought to the office in a pitiable condition of pain, weakness and corrosion around the anus. A carcinoma in the lowest part of the ampulla recti involving the anal ring, had a diameter of about 6 cm. It was situated on the left and posterior wall, was ulcerated and the neighborhood was somewhat infiltrated. The lower border was protruding from the anus. The local and the general condition did not seem to warrant surgical measures. Radium was given in a—for this region—almost ruthless dose. She received at once 2400 milligram hours November 10, 1919. In February 1920 we gave another 2200 milligram hours. The patient improved splendidly. In November 1919, when first seen she only weighed 75 pounds. In February 1921 her weight was 115 pounds, a gain of about 40 pounds. Her only trouble now is a prolapsus of the rectum. The sphincter does not act; we had produced an extensive sloughing by the radium; but apart from a slight thickening in one place, all was healed and the patient is very happy over the result.

This is an unusual case, as in other instances (especially when the growth was fixed solidly to the sacrum) the patients pay almost too dearly with pain for the small benefit which is principally psychic.

The Frenchman says, that the art to becoming a bore is to be complete. So I will not longer abuse your patience. You all have read much about the favorable influence of radium in

numerous more harmless skin affections like acne, warts, keloids. The latter especially when recent melt away beautifully, and if the cosmetic result then is not quite satisfactory, the base of the keloid can be resected after the radium effect upon the keloid and it will not recur as it otherwise usually does.

The rapidly multiplying cells, as for instance the normal cells of skin and testicle, are far more influenced by the rays than the long living ones as exemplified by the cells of the central nervous system. The fast multiplying cells seem stunned and sterilized by the rays. Thus even if the microscope still shows tumor cells as present they may be inert, impotent of making trouble for different lengths of time.

The basal cell carcinomata or rodent ulcers of the face seem to give striking and permanent results, so that if you feel sure of your diagnosis surgery may be dispensed with. Cures lasting 6 and 8 years are on record. Personally I feel safer with surgical measures, eventually followed by radium.

With other malignant conditions we must be guarded in reporting cures. But if radium should give only temporary results in these disastrous cases it has its welcome place in the medical armamentarium. Its usefulness often increases in combination with the hot iron and the knife. While the knife and the hot iron, the two classical weapons of the surgeon in his battle against malignant growths, destroy equally normal and pathological tissue, the hot iron probably having the additional beneficial effect over the knife in not leaving an exposed fresh wound for implantation and in producing a cicatricial change beyond the line of destruction, which cicatricial change imprisons and starves possible remnants of cancer cells in the directly adjoining tissue, the radium has more of a selective action which we know already from the roentgen treatment.





## THE MEDICAL EXPERT WITNESS\*

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In approaching the preparation of this paper I confess to much hesitancy and misgiving. I am not unmindful of the fact that in dealing with the subject in hand, namely, medical expert witnesses, I am obliged to trench upon matters which of necessity are more familiar to my audience than to myself.

I am also mindful of the fact that while it may be an easy matter for one of my profession to argue a case in court or even to harrangue a public gathering from the stump it is a vastly different thing to prepare and present a message which may prove either instructive or interesting to members of a profession composed of men who have spent years in preparation for their calling and who have spent more or less time in the still more valuable school of experience.

The advancement of the sciences and the progress of research in the various fields of knowledge have made expert testimony and especially medical expert testimony of constantly increasing importance in the administration of justice. The range of medical expert testimony as we are called upon to consider it in the courts is wide in its scope and touches nearly all human affairs as they are dealt with in our tribunals. In fact the range of subjects calling for expert testimony and opinion evidence is so wide that only a brief reference can here be made to the more important branches covered by it.

The subjects most often encountered by the courts requiring medical testimony relate to the different forms of mental alienation, to injuries inflicted upon the living organism such as wounds, poison, violence, infanticide and injuries and death caused through negligence. The subject also relates to inquiries such as legitimacy, rape, pregnancy, sterility and impotency and also to controversies arising out of deceptive practices such as feigned diseases as well as a vast number of miscellaneous questions relating to age, identity, presumption

of seniority, survivorship, and many phases of life and accident insurance.

In administering the law in our courts where questions arise out of the foregoing kindred subjects it is of course always necessary to have recourse to the opinions of physicians, surgeons, x-ray experts, chemists and other associated scientists. These opinions, whether written or oral, are made use of by the courts subject to certain rules which have been adopted as best calculated to assist in arriving at correct results and which it is believed will best promote the ends of justice. Such expert testimony is not received because the witness is supposed to have greater sagacity and judgment and power of reasoning. If such were the purpose such men might be called in all cases to advise the court and jury as to how the case should be decided and thus change the entire mode of trial; the true purpose of calling such witnesses is to receive the benefit of their professional skill, knowledge and experience and thus enable the court and jury to draw inferences where men of common experience after all the facts have been proven would still be left in doubt. It is hardly necessary to say that expert evidence on the foregoing and kindred subjects is of inestimable value and is the only way by which vital facts along these lines may be brought before courts and juries for determination.

It is a fact well known to the members of both the medical and legal profession that the lay-public often severely assails the manner of trial and the results obtained in many criminal and civil cases where expert medical testimony furnishes the determining factor in the verdict reached. While this feeling on the part of the public is to be deplored, yet, in view of the superficial knowledge possessed by the average critic in respect to the cases upon which he freely passes judgment, it is not astonishing that the whole system of administering law is thus assailed. Insofar as the attacks are justified, the members of both our professions are vitally interested and both professions should put forth an earnest effort to remedy the defects complained of.

One of the popular cries against the courts and the medical experts who appear as witnesses is that the testimony of such experts is

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highly partisan and even in certain cases the subject of purchase. In an experience of twenty years in the practice of law and ten years on the bench I can say with sincerity that it has been my observation that the average medical expert witness gives his testimony with candor and frankness and with less partiality than is found among other classes of witnesses. It is true that the character of opinion evidence is such as to make the charge of falsity or of bias easily made; but in the main such charges are without foundation.

It is a familiar fact to every Judge and lawyer that in their testimony regarding the simplest facts the most truthful witnesses will often disagree.

Critics of medical expert testimony fail to recognize the fact that all branches of testimony produced before courts are open to many of the same charges made against the medical expert.

It is idle to deny the claim that there are many miscarriages of justice in cases where medical testimony plays an important part but this is more often due to the ignorance or prejudice of juries, pettifogging practices of counsel or the incompetence of the Court itself, than to unfair or dishonest evidence on the part of experts. Much prejudice in the public mind has grown out of such cases as for instance the Thaw trial. It will be recalled the important part played in that case by alienists who arrayed themselves in about equal numbers, either for the state or for the defense; and how it was currently reported that fees of experts aggregated many hundreds of thousands of dollars. In that case the defendant's mental condition was the vital issue and called for and probably received a high degree of learning and skill on the part of experts. Just how far the jury were influenced by such evidence was of course a matter of conjecture. Strange as it may appear there are few cases in which expert testimony is received with so great indifference by the jury as in those where the determination of sanity is involved. The defense of insanity in criminal cases has doubtless often been abused and in the lay mind is frequently looked upon with suspicion. The average jury seems to recognize no species of insanity which is not accompanied by mental

vauety or frenzy. All other forms fail to appeal to him and he is quite likely to be skeptical as to their actual existence. If the person whose sanity is being investigated is able to answer questions intelligibly it is pretty difficult to convince the ordinary jurymen that he is insane.

It is also a fact that the jury is especially inclined to be suspicious when a medical witness appears in the role of advisor or associate counsel, sitting beside the attorney who calls him, taking copious notes and making many whispered suggestions. In the estimate of the ordinary jurymen this stamps him as a partisan who has come to court prepared to fight for his side of the case and for that side alone. The medical expert witness must of course often instruct counsel on some obscure medical questions involved in the case but he will, if wise, studiously avoid placing himself in the apparent role of a retained assistant counsel.

The view is often held by the public that a certain number of experts swear on the one side and in opposition to a certain number on the other and to an opposite state of facts. This view, as we all know is unfounded and absurd. As a matter of fact experts often disagree but this is largely due to the fact that they are not asked to give opinions based upon the same assumption of facts. Each counsel questions a witness from a different standpoint and selects facts and embodies them in his hypothetical questions most favorable to his own view of the case. Too often the jurymen regards the hypothetical question as a cunning device by the lawyer to muddle him and he is quite apt to include the doctor in the conspiracy. Of course expert opinion is of no value whatever unless the assumptions in the hypothetical question are true and it sometimes happens that counsel are unable, either through lack of knowledge or otherwise, to elicit from the expert the line of opinion evidence required to enlighten the court and jury.

Referring again to the plea of insanity as a defense to criminal charges and the prejudices which exist in the mind of the public with reference to that defense we must understand that we can only meet and overcome such prejudice through a fair and honest presentation of the facts in each case and by steadfastly refus-



ing to aid or abet a defense based upon that ground except when after a thorough examination the facts are found by the expert to warrant such defense. It is doubtful if the lay mind will ever be able to grasp the full truth regarding the plea of insanity but a thoroughly conscientious effort on the part of both professions will go far toward inspiring confidence both in the minds of jurors and the public in general.

Another fruitful source of criticism made against the courts and in many instances indirectly against the medical expert is occasional miscarriage of justice in personal injury cases. Charges are freely made that certain unscrupulous lawyers and doctors acting in co-operation have in many cases succeeded in obtaining unjust and unwarranted verdicts in this class of cases. As a matter of fact there are few such instances in comparison to the great number of legitimate damage suits tried in our courts. But there is just enough truth in these accusations to throw a certain degree of discredit upon both professions.

Not so very long ago it was alleged that a passenger in a street car was violently thrown against a seat, thereby sustaining a concussion of the spine rendering her a physical wreck. She was examined by certain physicians who reported a tumor which her family physician testified was four times as large at the time of the trial as when it first appeared a short time after the accident. There was considerable dispute in the evidence as to whether a tumor could be produced by such an accident. The jury concluded that it could be so caused and returned a verdict for twenty thousand dollars in favor of the plaintiff. On the motion for a new trial heard a few months later it was shown that the plaintiff had given birth to a still born child at full term and that she had not at any time been afflicted with a tumor. Perhaps an honest mistake had been made but the case was not one calculated to inspire the confidence of the lay-public.

We are all familiar with the theory of traumatic cerebro-spinal concussion, railway spine, traumatic neurasthenia, traumatic hysteria and kindred manifestations. A few years ago personal injury cases against railway companies based upon these conditions were frequent. To

some extent such cases still appear in the courts. Some of them are doubtless meritorious and yet every lawyer and every physician knows perfectly well that through cases of this kind railways and others have been defrauded out of hundreds of thousands of dollars.

It is of course recognized by everyone that justice often fails. But it will be well to remember that however far short the courts may fall in administering the law the fault lies not so much in the system itself as in the infirmities of human nature through which it must be administered. It is not strange that with the human frailties and imperfections which must ever be found in those constituting our courts, equal and exact justice will often fail; but this fact furnishes no reasonable ground for condemning the whole system of jurisprudence which is often done by extremists and radicals. The judicial system of this country and the English system which is its parent is the best that human wisdom has yet devised. It of course falls far short of the ideal which contemplates a jury wise and unbiased, counsel ever desirous of enlightening the Court and jury rather than to befog them, and witnesses impartial and at all times truthful.

Along with other criticisms aimed at our judicial system comes at times the denunciation of the medical expert and it often happens that an honest and learned physician giving testimony in support of what he believes to be a just cause is nevertheless berated and ridiculed by opposing counsel and perhaps discredited by the general public. From my own observation I am convinced that the task set for the medical expert in many cases is far from a pleasant one and his difficulties are greatly multiplied because it so often happens that the lawyer who undertakes to examine or cross examine him is unable to adequately or properly do so. The members of both law and medicine should not lose sight of the fact that the subject of medical legal jurisprudence is a theme worthy of their most careful study and consideration. Especially should the lawyer follow out lines of careful study of questions involved or likely to be involved in cases where medical expert testimony is required. This he may not expect to do with any such degree of thoroughness as must the physician but he

should at least do so with a sufficient degree of care and understanding to enable him to intelligently examine and cross examine the medical expert; and also to recognize in his own practice the scope and bearing of medical-legal questions arising in cases with which he may be intrusted.

Would it not conduce to professional advancement if occasionally there were to be an interchange of lectures by members of each profession covering the subjects in which we are jointly interested? Would not such a practice result in a better understanding of the code of professional ethics as applied to both law and medicine? A physician who goes upon the witness stand in an important case without a preliminary knowledge of the rules of evidence and especially as to the practice concerning examination and cross examination of witnesses is often placed in an embarrassing position and sometimes fails to get clearly before the jury the matters of most importance. A little elementary study along these lines would often save him embarrassment and even professional depreciation. In giving his testimony he should limit his evidence to facts called for by the questions put. He may feel that the question is unfair and does not call for evidence which he believes should be produced but he should "possess his soul in patience" and allow the propriety of the question to be settled by the Court. There are of necessity many questions he cannot answer with certainty. In such cases he should be careful to express a qualified opinion only. It is of the utmost importance that he avoid digression from the question asked and that he refrain from speculation and from volunteering testimony. In fairness to himself and all concerned he should, before going on the witness stand, go over the ground to be covered by his testimony with the attorney calling him, not merely as a precaution against surprise during the examination but largely that the attorney may understand just what points the witness is prepared to cover and thus avoid asking questions which would be absurd or at least irrelevant.

Again, there is much in the manner of giving expert evidence. It is important that the witness should impress the Court and jury with his absolute sincerity and earnest purpose to be

fair and of his knowledge of the subject matter. Occasionally a physician will allow himself to be drawn into a fencing match with opposing counsel and while it is true that the doctor usually gets away with the lawyer because he knows more about what he is talking about than the lawyer and is often able to crack a joke at the lawyers' expense still every time he does so, he weakens himself with the jury. They are apt to regard him as a sharp or witty man but as a rule people are not inclined to attach great weight to the evidence given by that sort of witness. My advice is that when the temptation comes to crack a joke on the witness stand never to yield to the temptation. We laugh at jokers when that becomes their predominant characteristic but as a rule we do not choose them either as advisors or as authorities in important concerns of life. Every lawyer who knows his business will tell you that every time a witness on his side of the case gets funny or tries to joke that instead of laughing he feels more like fighting. The would-be humorist on the witness stand sometimes succeeds in getting the court room to giggle and he is always sure to laugh at his own jokes but the jury is likely to regard him as a light hearted individual whose evidence is not worthy of much consideration.

Next to a knowledge of law the most important part of a lawyer's stock in trade is a knowledge of human nature, and when he sees that the testimony of a medical expert is damaging his side of the case he frequently knows that if he can provoke the doctor into saying sharp, sarcastic or savage things or getting him to cracking jokes he has robbed his testimony of its most dangerous qualities by destroying in large part its influence with the jury. On the other hand, if the expert succeeds in keeping his head and if he treats the matter in a candid, serious and straight forward manner, even though the jury may think him a trifle slow, his evidence will carry weight, for the jury is likely to regard him as sincere and honest.

I venture another suggestion to the expert, that is, particularly to the young expert. The more experienced of course do not need it. It is this: Always bear in mind that you are talking to laymen. Therefore couch your testimony in the plainest and simplest language.



Talk as if you were teaching a class. Let the size of your words be measured by the capacity of your audience to grasp their meaning. If there is anything to be abhorred in a lawyer's argument or in a physician's testimony it is a lot of Latin words. What do we talk for? Merely for the purpose of conveying our ideas to the jury. Therefore speak simply—in language through which the jury may understand the facts which your evidence is offered for the purpose of proving. There is hardly a part of the human anatomy which cannot be referred to before Court or jury by its English name. If this be true why not drop most of the Latin and use the English when upon the witness stand? Isn't it just as easy to say knee, elbow, foot or hand as to use the Latin name? To most of us it would be much easier.

The feeling sometimes becomes fixed in the mind of the jury, Court and counsel during the trial of a case that the expert is simply a hired advocate of one side or the other. The true position of the expert should be a judicial one. He should consider the matter in dispute entirely free from prejudice and give a fair and unbiased opinion. When the jury believes he is so doing his evidence will carry great weight. Let a witness go upon the stand, and, if called by plaintiff, at once begin to magnify the injuries of plaintiff: or, if called by the defendant, swear as hard as possible that there is nothing permanent about the injury, and in fact go to the very limit of partisanship, the evidence is very likely to have little weight.

The situation is even more open to criticism by the lay-public when both sides of the case offer expert testimony which must from the very nature of it be untrue either on the one side or the other. The public is likely to get the idea that it is merely a question of which side first gets the expert who is most clever in perverting the truth. This situation is illustrated by the case where a noted attorney had just finished an able argument to the jury. The case being tried on the defendant's side by a local attorney who made no pretensions to oratory. When he arose to answer counsel he said:

"Gentlemen, you have just listened to an able and eloquent speech by counsel for the other side. But let me tell you, we would have had that speech on our side if our telegram had

reached him a few minutes before the plaintiff's did."

That is the way critics regard the matter in some instances. They get the idea that testimony is for sale to the first comer; that the expert has no conscientious scruples in the matter and is governed by a monetary consideration.

It may be that some of you are very naturally asking me how it is that I who belong to a profession which is ready to be retained by either side without always going to the merits of the controversy, can censure members of another profession for holding themselves open to serve whoever may first employ them as expert witnesses. The difference is this: Lawyers, when retained to represent their clients in court, do not assume to act judicially. That is, the lawyer does not assume to say that he has examined both sides of the case and that he testifies under oath impartially; that the side which he represents is the right side. He understands and everyone should understand his position. He is there to advocate one side and to make it look the best he can. He does not pretend to give his opinions based upon the entire transaction. But he attempts in the best way he can to fight for his side. It is thoroughly understood that he is not attempting a confidence game by claiming to be impartial and then not being impartial. Let it be plainly understood, however, that it is equally to be condemned for the lawyer who has a case without merit to be an active agency in subordination of perjury by the employment of experts to bolster up a weak case. Who shall say that the hired perjurer is worse than the man who employs the other to do the lying for him?

A number of attempts have been made in various states to regulate the matter of expert evidence by statute. One plan is to appoint experts by the Courts. In my judgment the plan is not practical. The reform must come through a higher standard of professional conduct in both professions rather than through legislation. We lawyers as a rule do not place much more faith in the enactment of statutes to make men moral and good than the members of your profession put in patent medicine pills to make all men well. Much can be done to remedy the defects in our system of medical

jurisprudence by your own medical societies and by our bar associations. Our professions are amply able to correct the evils complained of and to rid themselves of the unscrupulous. The legal profession should make it a solemn duty to guard against the admission of candidates unfit or unqualified, because deficient in either moral character or education; and both of our professions should actively co-operate in an effort to make it impossible to secure the testimony of medical experts for any other purpose than as impartial judicial exponents of the truth.

Let me say that my experience as a lawyer and a Judge shows me beyond a doubt that there is little upon which to found just criticism of the medical expert. There are of course dishonorable practitioners in your profession and in mine. The percentage is small but both professions suffer by the acts of these unworthy exceptions. It is with our professions as with the individual. The good things which he does in life, though extending through decades, do not fix his reputation as much as do the bad things though extending through minutes. Forty years of right living are often forgotten by the public when it learns of one moment of wrong-doing. So it is with our professions. They are too often made to suffer for the sins of the few unscrupulous individuals. It is therefore of vital importance for all to be ever alert, vigilant and active in exposing, expelling and if need be in prosecuting the dishonest and unethical practitioner whether he be lawyer or doctor. We are all vitally interested in the suppression of both the shyster lawyer as well as the quack and mal-practitioner. The members of these two great professions need no reminder that we shall always find our highest honor in a deserved reputation for fidelity not only to clients and patients but to public duty as honest men and patriotic loyal citizens.

In closing let me assure you that I regard it a privilege to address the members of a profession for whose membership I have the highest respect. We, who call upon you in our most anxious hours need no reminder that your profession has done and is doing a mighty work in relieving the sufferings of mankind. We well know that wherever duty calls there you are found. Wherever there is pain and suffer-

ing, whether it be in the darkest night or the fiercest storm, whether in the home of poverty or the dwelling of the mighty, whether in the midst of plague or upon the field of battle the true physician never falters. He is a repository of the most sacred family secrets and he never betrays them. To belong to such a profession is indeed to be chosen for the highest plain of usefulness.

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## SURGERY OF THE PROSTATE\*

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Lesions of the prostate show few variations in type. Probably not more than one-half are surgical. As shown by Judd and Crenshaw in a review of all patients seen in the Mayo Clinic for a period of eight and one-half years in whom symptoms were produced by prostatic lesions, only 42 per cent were surgical; these were subjected to operation.

Prostatitis is of two distinct types. The acute form, practically always due to gonorrheal infection, occurs most often in young men, and because it usually responds to nonsurgical treatment is very seldom treated surgically. Chronic prostatitis may be the result of gonorrheal infection in youth, but may give rise to few symptoms until later in life. In a recent review of 856 cases in which prostatectomy was performed the gland was of the chronic fibrous type in fifty, without adenomatous hypertrophy; in forty-eight, prostatitis was the primary condition, and the glands contained a few small adenomas, while in fifty-six marked prostatitis was associated with primary adenomatous hypertrophy. Chronic prostatitis, with little enlargement of the gland, is capable of producing all the symptoms of adenomatous hypertrophy; that is, frequency, difficulty, and incomplete emptying of the bladder, with the residual urine at times amounting to the entire capacity of the bladder, and in some cases, acute retention. The marked fibrosis in this type of prostatitis and the absence of cleavage planes correspond to those changes occurring in

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other parts of the body following infection, which would indicate that infection must play an important part in the etiology of urinary disturbances in the presence of this type of gland.

Prostatic abscesses, single or multiple, quite often occur secondary to the acute infections of the prostate during the course of venereal disease. Few, however, become surgical, for they usually point and drain through the urethra. As a surgical condition, therefore, prostatic abscesses are of relatively slight importance.

Carcinoma of the prostate is found in 15 per cent of the patients with symptoms of prostatic obstruction. Unfortunately, the onset of these symptoms is gradually insidious and, as is seen in malignancy elsewhere in the body, the symptoms are usually manifest only after the disease has advanced locally to the paraprostatic tissues and the bladder, and remotely by metastasis. Surgery has seldom been productive of permanent good results in these cases. Bumpus, in an analysis of 362 cases of carcinoma of the prostate observed in the Mayo Clinic, found that remote metastasis had occurred in 21.8 per cent. This finding led to a more careful examination and search for metastasis in a later series, and metastasis to the bones was revealed in 30.3 per cent of 135 patients who were subjected to roentgen examination. The bones most frequently involved were those of the pelvis, and spine, and the femur. Metastasis to the lungs occurred rarely and late in the disease; it was found in the regional glands in 10.2 per cent of 362 cases.

Metastasis found at the first examination immediately removes from the surgical field approximately 40 per cent of all cancers of the prostate. The local advancement of the disease with its early involvement of the bladder and of surrounding structures, and the discouraging results following the radical operation have also excluded practically all the cases without metastasis from surgical treatment, except a small percentage in which palliative suprapubic drainage is necessary. Bumpus states that of 146 patients with carcinoma who were subjected to prostatectomy 80 per cent died within two years after operation, and that of sixty-six patients who lived more than

three years only seven are alive, after seven years.

Benign adenomatous hypertrophy is by far the most frequent surgical lesion of the prostate. It occurs most often late in life. Only 5 per cent of a series of 856 patients were under 50. Twenty-eight per cent were between the ages of 60 and 65, and 83 per cent were in the sixth and seventh decades.

It has been pointed out that the size of the gland bears no relation to the amount of disturbance it may produce. In 9.7 per cent enlargement of the gland was graded 1 (on a scale of 1 to 4), in 48.45 per cent it was graded 2, in 33.95 per cent it was graded 3, and in 7.8 per cent it was graded 4. A slightly enlarged gland may produce marked obstruction with the residual urine amounting to the full capacity of the bladder, while a huge intra-urethral and intravesical gland may not produce mechanical interference with complete emptying of the bladder at urination, or any of the other manifestations of prostatic disease, and may be spoken of as the "silent" prostate.

The indication for or against operation in benign hypertrophy of the prostate are based on the amount of disturbance the gland is producing and the general condition of the patient. A large prostate, found in the routine examination, if unproductive of frequency, difficulty, pain, hematuria, or incomplete emptying of the bladder with resultant residual urine, is of itself usually not surgical. However, when any or all of these symptoms are present as the result of adenomatous hypertrophy of the gland, irrespective of its size, the condition is surgical in the absence of general contra-indications.

The effect of enlargement of the gland on the urinary tract and on the general condition of the patient forbids immediate operation in a large percentage of these cases. When symptoms of prostatic obstruction appear there is nearly always incomplete emptying of the bladder with resultant persisting and increasing amounts of residual urine, but in 9.6 per cent of the cases in our series in which prostatectomy was performed there was no residual urine; in 37 per cent it was but two ounces or less, and in 16.6 per cent the amount equaled that of the capacity of the distended bladder, the patient voiding simply the over-

flow. With the advent of the residual urine and its back pressure on the kidneys, and the occurrence of secondary infection, pyelonephritis supervenes with diminished renal function of variable degree, depending on the amount of residual urine and the length of time it has been present. The finding of residual urine so constantly in prostatic obstruction, and the associated pyelonephritis makes it necessary that these patients be considered potentially, if not actually uremic. Recognition and treatment of the actual or potential uremia preliminary to operation is a most important feature to the successful management of cases of benign hypertrophy of the prostate. In many instances if large amounts of residual urine have been present for a long time, renal function is markedly diminished, as is shown by absence of return of the dye in two hours by the phenol-sulphonephthalein test, and by retention of urea to 100 mg. or more for each 100 c. c. of blood. There is often a severe cystitis, and 10 per cent of our patients have had associated single or multiple bladder stones. Removal of the residual urine and prolonged constant drainage and irrigation of the bladder by means of improving the renal function and general condition of the patient. This improvement governs the length of time that preliminary drainage should be maintained. It is our practice to institute drainage of the bladder in all cases when the residual urine is more than two ounces. This may be accomplished by suprapubic drainage or by a permanent indwelling catheter. The latter is preferable in most cases. Suprapubic drainage is reserved for patients who do not tolerate the urethral catheter nor improve by its use, for those in whom all urine is residual, with marked renal insufficiency and symptoms of uremia, for those with severe cystitis, and for those in whom there are single or multiple bladder stones. Patients who have had less than two ounces of residual urine and little or no renal insufficiency have been subjected to prostatectomy without preliminary treatment. This comprises approximately 25 per cent of the cases. About 50 per cent have been prepared for prostatectomy by permanent urethral catheter. The percentage in the latter group has recently been increas-

ed by confining to bed those patients who are otherwise intolerant of the urethral catheter, and by the utilization of the method of gradual decompression of the bladder, as described by Van Zwahlenburg, in patients with chronic retention and great distention of the bladder, who were formerly subjected to suprapubic drainage preliminary to prostatectomy.

There has been much discussion and difference of opinion on the effect of sudden emptying of a distended bladder. Some observers contend that sudden withdrawal of all the urine from a distended bladder is a dangerous procedure and precipitates uremia, while others have seen no ill effects. The operation of suprapubic drainage and the immediate withdrawal of all urine in the presence of chronic retention to the entire bladder capacity and marked renal insufficiency is not without danger, but is accompanied by a variable mortality rate. It would seem, from our observation of patients who have heretofore been subjected to suprapubic drainage, and of patients with similar cases in which decompression has been done in recent months by Van Zwahlenburg's method without mortality, that the sudden withdrawal of all the urine is a factor in precipitating uremia. The gradual decompression method has the distinct advantage of accomplishing all that suprapubic drainage accomplishes in most of the cases, and of increasing the percentage of cases in which the one-stage prostatectomy may be performed with safety.

The anatomic location of the prostate gland offers two methods of approach for surgical removal, the perineal and the suprapubic transvesical routes. Each method has its advocates and some surgeons employ the combined perineal and suprapubic approach. The perineal method possesses the disadvantages of possible operative injury to structures, resulting in the frequent postoperative complications of incontinence through injury to the external vesical sphincter, and of recto-urethral fistula through accidental opening of the rectum during the operation. The adoption of the suprapubic route by surgeons who have had experience with the perineal operation seems to indicate that these complications outweigh the advantages of the operation. The suprapubic route approaches immediately the part of the gland,



that is, the median and lateral lobes, in which adenomatous hypertrophy occurs, and affords an opportunity thoroughly to explore the bladder, and to treat frequently associated lesions such as calculi and diverticula, and, rarely, carcinoma of the bladder.

Some surgeons employ the two-stage suprapubic operation in all cases, and others employ the one-stage operation entirely. An intermediate course is taken at the Mayo Clinic; the one-stage operation is preferred after preliminary preparation by urethral drainage of the bladder. The percentage of cases in which the one-stage operation may be performed with safety has been increased by the use of Van Zwalenburg's method of decompression. In the past, the foremost argument in favor of the two-stage suprapubic operation has been the elimination of infection. However, the foul, sloughing wounds and infections in the pre-vesical space following the one-stage operation have practically disappeared and are now rarely seen. This absence of infection may be accounted for by the fact that formerly prostatectomy was performed with little or no preparation of the urinary tract by urethral drainage and irrigation of the bladder, and the operation was conducted in the presence of serious infection. The recognition in recent years, preoperatively or at operation, of diverticula of the bladder has eliminated a postoperative source of infection. The improved technical accuracy of the one-stage operation has been productive of better wounds, less infection, and a shorter convalescence. The two-stage operation necessitates the blind enucleation of the gland and, through the lack of facility to perform the operation accurately under the eye, to control bleeding, and so forth, directly opposes the general principles of surgery, with little or nothing to be gained by the patients through its use. The operation has been acclaimed ideal for the patient who is a poor risk, in that it is a divided procedure, is less time-consuming, and requires a short anesthetic. These reasons do not seem to apply at the present time. The progress made in surgery has improved the technical details of the operation of prostatectomy, and has presented us with anesthetics other than ether which excludes the time element as an important factor.

The choice of anesthetic is of great impor-

tance in prostatic surgery. It has always been desirable when employing ether to use a minimum amount and to perform the operation as rapidly as possible on account of the depressing effect of ether on the kidneys. Spinal anesthesia has been used largely throughout the country, but it has not been unaccompanied by danger. However, in our experience, Labat's method of employing this type of anesthetic has reduced its danger to a minimum; it has been devoid of complications or ill effects. The combined transsacral and abdominal infiltration with novocain affords an ideal anesthesia. For the past six months all operations for removal of the prostate gland have been performed by the use of one or the other of these anesthetics. They eliminate the time element from the operation and allow wide open exposure of the bladder, affording thorough exploration and visual removal of the gland, with accurate control of the bleeding. To the patient who is a poor risk exposure and accuracy in the operation are exceedingly important, for he is intolerant to post-operative bleeding.

Important details in the one-stage operation are (1) careful suturing of the bladder neck, which is the source of most of the bleeding, (2) control of the bleeding from the interior of the prostatic capsule, and (3) accurate closure of the bladder. Various methods have been devised to control the bleeding from the interior of the prostatic capsule. The Pilcher bag is being used successfully in the Clinic for this purpose; by its use all of the suprapubic tubes may be removed from the bladder the day following operation, and a urethral catheter inserted, which in the majority of cases allows the wound to heal by first intention, with no urinary drainage suprapubically after the removal of the bag. The convalescence is materially shortened in these cases.

The mortality rate in the operation of prostatectomy has been greatly reduced during the past few years. This has been due to (1) the recognition that these patients are potentially uremic, and that treatment of the actual or potential uremia is necessary before operation, (2) the increased technical accuracy of the operation, and (3) the elimination of ether as the anesthetic. Greater care in the selection of cases,

more accurate determination of when the patient is ready for operation, and the use of anesthetics that do not depress the kidneys should reduce the mortality rate to approximately 1 per cent. Suprapubic prostatectomy is productive of excellent functional results and is devoid of any of the complications of the perineal operation. The results of operation have recently been determined by questionnaires sent to 614 patients. Ninety-four and five-tenths per cent report that they are cured or markedly improved.

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#### DISCUSSION

Our recent experience has convinced us that sudden withdrawal of all the urine from a chronically distended bladder in the presence of marked renal insufficiency is a factor in the causation of sudden uremia. The gradual decompression method has practically eliminated the precipitation of uremia by the use of the catheter or suprapubic drainage.

Infection of the prevesical space has largely been eliminated by the preliminary drainage and irrigation of the bladder through a permanent urethral catheter and by opening the bladder during the operation only after it has been emptied of urine and wash water. Heretofore, when the bladder has been distended, before incising it the operative field has been flooded and infection disseminated throughout the wound.

I wish to express my appreciation of the invitation to be present at the initial meeting of the Northern Minnesota Medical Society. I hope that with the growth of this society it will become as valuable an organization to you as the Southern Minnesota Medical Society is to us.

## GENERAL THERAPY IN DISEASES OF CHILDREN\*

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Institution of therapy, in non surgical diseases of children, usually calls out the prescription pad and a struggle with Latin terminations ensues. The struggle, however, is often avoided by simply prescribing X, Y, & Co.'s., cough mixture or some proprietary "tonic". It is time for us to appreciate treatment in a much broader sense.

The dictionary in defining therapeutics states that "it not only includes the administration of medicines but also the application of hygiene, dietetics, atmosphere and other non-medicinal influences to the preservation, or recovery of health." Because of lack of interest or time the non-medical agencies are too often omitted.

In pediatric therapy drugs play a minor role—non-medical treatment is of far greater importance. However, drugs need not be entirely discarded. What I wish to emphasize is the importance and the application of a few therapeutic agencies which include:

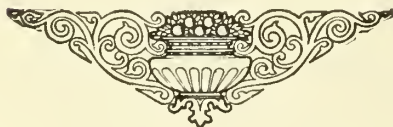
Diet, Water, Heliotherapy, Rest, Occupational Therapy, and Training and Discipline.

The use of these measures make great demands upon the physicians time and patience. The rationale must be given the mother, directions must be explicit, no detail omitted. There are few dramatic experiences in the pediatricist's daily rounds, rather it seems an endless chain of petty detail. But there is compensation in the fact that his work is largely in the field of preventive medicine.

#### DIET

Early ideas of diet were vague. Food was considered a "filler" to appease hunger and incidentally provide heat and energy. Later it was shown that a good diet should consist of proper proportions of protein, fat, carbohydrates, mineral salts and water. Then there developed the method of determining the calorific values of foods and the caloric requirements of the individual. It appeared that the study of diet was

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reduced to an exact science. But it was soon demonstrated that calories alone would not keep one alive.

It was observed that children fed on diets poor in vegetables and fruits became constipated, anemic and fell into poor nutritional states. Since Barlow's time it had been known that the lack of fresh foods would produce scurvy, a condition miraculously curable with orange juice.

Eijkman<sup>1</sup> in 1897 noted that fowl fed on polished rice became paralyzed and developed symptoms of beriberi. Hopkins<sup>2</sup> in 1912 showed that although an experimental animal were fed proper amounts of the recognized food elements in a *pure state* the animal died. The fatal deficiency was overcome if a little fresh milk were added to the dietary.

Funk<sup>3</sup>, in 1912, coined the term "Vitamin" for this essential but unknown element. It was soon learned that not all fresh foods possessed this protective property in adequate amounts. Even milk varied in this respect according to the food provided the cows. Dutcher<sup>4</sup> showed the vitamin content of the milk was greatest when the cows were eating green grass. It is proven that for animals the source of vitamins is plant life. The ultimate source however, is the soil and the vitamin content of plants varies with the character of the soil. Offspring of parents suffering from a lack of vitamins in the diet likewise present symptoms of the deficiency.

The literature on vitamin is already voluminous. There exists much confusion and our knowledge of them is fragmentary. They have not even been isolated chemically—neither have the toxins of bacteria, nor the body ferments. There have been described the water soluble vitamin of yeast and cereals, curative for beriberi—the antiscorbutic vitamin of orange juice and other fruits and vegetables—the fat soluble or growth vitamin of butter and codliver oil. Byfield<sup>5</sup> has shown that orange juice besides its antiscorbutic vitamin possesses growth producing properties as well. It is probable that the problem is complex—that substances from all these sources are necessary for proper nutrition and growth and that we should get away from the idea of specific vitamins.

However little we know about vitamins this fact is established—they are very unstable. Ex-

perience has long taught the excellence of fresh foods—that the exclusive use of dessicated and canned food produces scurvy. However, it is not simply a matter of drying and canning. Hess<sup>6</sup> has pointed out various factors and concludes that vitamins are destroyed by prolonged heating, dessication, ageing, oxidation, and chemicals such as alkalies.

But there are paradoxes in the problem. Though tomato juice is sterilized and canned it may maintain its vitamin content for a long time, if oxidation is prevented—perhaps because of the high acidity of the tomato. Contrary to common belief he showed that milk suffers less in vitamin loss if boiled for two minutes than by pasteurization. Stranger still, when milk is subjected to very high temperature for a few seconds, as in the Just roller process of producing dried milk—it maintains almost its full vitamin content.

Deficiency of vitamins predisposes to infections, produces constipation, loss of appetite, and varied indispositions. This probably explains the former use of sulphur with molasses and other "spring tonics". Long continued lack of vitamins in the dietary may lead to deficiency diseases.

The deficiency diseases which we encounter in pediatrics resulting, in part at least, from lack of vitamins are scurvy, rickets, polyneuritis, certain types of atrophy, certain types of malnutrition.

These disorders are chronic in character, the condition often resulting only after long periods of dietary imbalance. Well advanced cases are easily recognized. But I wish to emphasize that in the earlier stages, though we cannot specifically diagnose deficiency disease we are well aware that the child is not doing well. There may be pallor, stationary weight, anorexia, hyperirritability and inactivity. Doubtless in the future we will recognize many symptom complexes chargeable to improper diet.

Of course malnutrition may flourish as a result of the lack of all food elements as is illustrated in Austria today. But this is not the status of the average American child. In fact these disorders are often found more prevalent in the homes of the wealthy than in the poorer families. It is a question of proper selection of

foods and not of financial ability to provide proper diet.

What is the practical application of these facts in our work? Remembering that our knowledge is rapidly growing and our ideas of diet consequently changing one may state that the following tenets appear well founded.

(a) The ideal infant food is mother's milk. Though more rarely than in the artificially fed, still, scurvy and rickets do develop in the breast fed—perhaps as the result of constitutional states in the mother or deficiencies in her diet.

(b) For the artificially fed infant some simple milk mixture containing the proper amounts of protein, carbohydrate and fat is best. Sterilization by boiling for two minutes lessens the danger of infectious diarrheas and destroys less of the vitamins than the process of pasteurization. Under certain conditions a good dried milk may be better than a poor natural milk.

(c) Some antiscorbutic such as orange or tomato juice should be added to the diet of the artificially fed child as early as the second month—and to that of the breast fed child as well if it is not prospering.

(d) Vegetables should be a part of the baby's diet at the age of six to eight months.

(e) In older children the diet should be well balanced, the calorie intake sufficient and ample vitamins provided.

In many homes this means a radical change from highly refined foods to coarser, simpler ones.

(f) Certain obscure nutritional disturbances showing atrophy, loss of hair, varied skin lesions, polyneuritis and mental apathy clear up on good hygiene and forced feeding of vitamin containing foods such as milk, butter, fruits vegetables and yeast.

Hess states:—"One of the most novel medical conceptions is that serious diseases or functional disorder may be occasioned by a mere lack of certain constituents in the dietary. Until recently we were wont to associate tissue damage or functional disturbances solely with the introduction of some harmful foreign substances—chemical or bacterial—into the body. It is not only remarkable but also creditable that a concept so revolutionary should have gained wide acceptance in so short a time, not only among

the medical and scientific world, but among the public at large—".

We must wake up to the importance of this subject and be prepared to advise our patients on matters of diet or we will see the rise of diet fads and "vitaminopaths." Already the papers announce that a certain yeast producing concern is prepared to cure most of the ills of mankind with its product.

#### WATER

We all appreciate and use hydrotherapy to some extent. But it has a very intimate use in therapy which is not fully recognized. Water comprises 75 per cent of the infant's weight and is a big factor in its unstable metabolism. As a result of vomiting and diarrhea children develop acidosis. A similar state may develop in pneumonia, scarlet fever, in fact in most acute infections. Marriott has shown that this is due to loss of body fluids—dehydration. He has shown that in dehydrated infants the blood volume may be reduced to as low as one-eighth the normal. It is evident that the blood flow will suffer like reduction—for instance, the blood flow through the lungs will be reduced to one-eighth the normal. This leads to suboxidation and results in the collection of acid products in the blood, intoxication and acidosis. The cure for this condition is not some specific drug but the introduction of water into the body. Too often the need of water is not fully appreciated—but rather because of the intoxication calomel or other drastic cathartics are exhibited. This leads to the loss of more water by bowel and exaggerates the condition. Or again differentiation between hunger and thirst is not recognized the infant is offered quantities of milk which it takes to relieve thirst with resultant vomiting, diarrhea and increased intoxication.

Balsar, Sansum and Woodyatt postulate that the water level of the body is a big factor in fever. Fever occurs in dehydration—with abundant water in the tissues fever is lowered, in part at least, by evaporation of fluids.

With but few exceptions the first desideratum of the acutely ill child is water. Water should be given in large amounts. If there is no vomiting it may be given by mouth—not haphazardly but in measured amounts at stated intervals. We have seen an infant of five months take up



to two and one-half quarts in the 24 hours. By bowel a considerable quantity may be given by the Murphy drip. Sometimes one has greater success by instilling small amounts at frequent intervals. In the presence of vomiting and diarrhea normal saline may be given subcutaneously, or into a vein or the superior longitudinal sinus. The two latter procedures however, are difficult. We have had brilliant results from injecting normal saline directly into the peritoneal cavity. We have given an infant up to 300 cc. in this manner with what appeared to be a life saving effect.

In severe cases a combination of methods may be employed. For its nutritional value dextrose from 3 per cent to 5 per cent may be added. We have yet to see virtue in the administration of sodium bicarbonate in acidosis—if water does not avail soda will not.

#### HELIO THERAPY

Heliotherapy is a powerful therapeutic agent too little employed. Rollier<sup>9</sup> pointed the way in his treatment of "surgical" tuberculosis. It is of value in many skin lesions. It stimulates appetite and well being. It powerfully affects metabolism—the white count can be doubled by exposures to sunshine; it aids in raising the hemoglobin. It is almost as applicable at our altitude as in the mountains of Switzerland—we have the same sunshine here. It is not an agent to be used carelessly—too abrupt an exposure for too long a time produces intoxication. An exact technique must be employed which one can find in articles by Rollier, Dietrich<sup>10</sup> and others.

#### REST

In many undernourished, hyperirritable children with but little resistance to infection nothing succeeds as well as a period of rest in bed with forced feeding and massage. We have repeatedly seen children gain from ten to twenty pounds in a month of this regimen. It is almost impossible to measure the benefits of such results.

#### OCCUPATIONAL THERAPY

In chronic disease or protracted convalescence we too often expect our little patients to be oblivious to everything except getting well. It is too much to ask of them. Exercises, occupational tasks, such as basket weaving and kindergar-

ten stunts make the child happier, stimulate appetite, promote sleep, and hasten recovery.

#### TRAINING AND DISCIPLINE

Very often a carefully worked out plan of treatment fails because of lack of cooperation on the part of an ill natured, spoiled, badly trained child. In such an instance training and discipline become a part of the treatment. This again is the duty of the physician to prescribe and direct—it cannot be left to an hysterical mother. Czerny<sup>11</sup> has written a delightful little book—*The Physician as a Trainer of the Child*. One can profit much by its perusal.

#### SUMMARY

1. The most profound influence on the growth and development of the child is diet. Its regulation cannot be left to the child's tastes, the mother's whims and the grandmother's superstitions. It is properly a subject for the physician's study and prescribing.

2. In many acute diseases the control of water balance is of paramount importance.

3. In the treatment of disease and maintenance of health accessory factors such as heliotherapy, rest, occupational therapy, training and discipline always aid and often supplant drug treatment.

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## A COMPARISON OF SOME MUNICIPAL HEALTH BUDGETS

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A comparison of the expenditures in various cities for the promotion of public health through the municipal health department is rendered somewhat difficult by the fact that there is as yet no general agreement as to what properly constitutes public health work. Certain cities are obviously more progressive than others and have taken a more modern and enlightened view of their responsibilities in this field. This lack of agreement in practice makes necessary a preliminary discussion of the underlying principles of municipal health protection.

Among the sources of information readily available are the report of the Cleveland Hospital and Health Survey<sup>1</sup>, the report of the study of the State Charities Aid of Sickness in Dutchess county, New York<sup>2</sup>, the report of the Community Health and Tuberculosis Demonstration in Framingham, Massachusetts<sup>3</sup> and the report of a committee representing the New York Department of Health, The New York Comptroller, The New York State Conference of Mayors and other City Officials on a Uniform Budget and Accounting System for Municipal Departments, Bureaus of Boards of Health<sup>4</sup>. Special articles by Chas. V. Chapin, Superintendent of Health<sup>5</sup>, Providence, Rhode Island, and by Carroll Fox<sup>7</sup> of the United States Public Health Service, deal with the same subject.

Dr. Donald B. Armstrong<sup>8</sup>, Executive Officer of the Community Health and Tuberculosis Demonstration, Framingham, Mass., has made the following classification for the average New York state city.

(A) Health measures of prime importance.

1. The suppression of communicable and industrial disease.
2. The reduction of infant mortality.
3. The control of the milk and the water supply.
4. The medical inspection of school children.
5. The study of contact and secondary infections and the control of disease carriers.
6. The control of hereditary and congenital disease factors.

(B) Health measures of secondary or indirect importance.

1. The control of housing conditions and other environmental factors.
2. The inspection of food and drugs.
3. The handling of municipal wastes.
4. The suppression of nuisances.
5. Insect and rodent elimination.
6. Plumbing inspection, smoke inspection, etc.

Dr. Armstrong mentions the cleaning of streets and the removal of garbage as measures of secondary importance or of indirect importance. Public health is purchaseable he says and so is public decency. It is very pleasant to have garbage removed and it is not very decent to have it lying around but the removal or non-removal has very little influence on our morbidity or mortality rates.

Dr. Charles V. Chapin, Superintendent of Health, Providence, has offered the following table of relative values not as final but to serve as a basis of discussion<sup>5</sup>.

### RELATIVE VALUES OF HEALTH WORK

|                                |    |
|--------------------------------|----|
| Vital statistics .....         | 60 |
| Education .....                | 80 |
| Laboratory .....               | 50 |
| Control of nostrums .....      | 50 |
| Care of sick poor .....        | 50 |
| Food Sanitation .....          | 10 |
| Milk adulteration .....        | 3  |
| Milk sanitation .....          | 17 |
| Nuisances                      |    |
| Privy sanitation .....         | 60 |
| Housing .....                  | 20 |
| Plumbing .....                 | 10 |
| Nuisances .....                | 10 |
| Refuse removal .....           | 0  |
| Fly and mosquito control ..... | 10 |
| Infant mortality               |    |
| Nurses .....                   | 80 |



|                               |     |
|-------------------------------|-----|
| Supervision of midwives ..... | 10  |
| Babies boarding houses.....   | 5   |
| Milk stations .....           | 5   |
| Consultations .....           | 20  |
| Prenatal clinics .....        | 10  |
| School inspection .....       | 80  |
| Contagious diseases           |     |
| Home isolation .....          | 100 |
| Hospitalization .....         | 50  |
| Immunization .....            | 50  |
| Venereal disease .....        | 20  |
| Tuberculosis                  |     |
| Nurses .....                  | 60  |
| Dispensaries .....            | 40  |
| Hospitalization .....         | 40  |

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1,000

Dr. Chapin's table may be summarized as follows:

|                                      |     |
|--------------------------------------|-----|
| Control of communicable disease..... | 360 |
| Child welfare .....                  | 210 |
| Education and vital statistics ..... | 140 |
| Sanitation, nuisances, etc. ....     | 110 |
| Food inspection, etc. ....           | 30  |
| Laboratory .....                     | 50  |
| Miscellaneous .....                  | 100 |

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1,000

According to these authorities the field of public health has developed and changed greatly during the past few years. Originally it was principally concerned with the maintenance of decency and later with isolation and quarantine, but its functions now include education of the individual in the protection of his health and incidentally in the promotion of the health of the community. Child welfare work, that is, the securing of health for the coming generation, has in consequence become one of its principal responsibilities. The obtaining of accurate knowledge of the facts of disease by research in laboratories and hospitals and the education of the public in every legitimate way regarding these facts now largely takes the place of the compulsion so largely relied upon in the first two stages of the work. In this new kind of health work "the nurse supplants the nuisance inspector and the physician takes the place of the policeman." Appeal is made to the enlightened self-interest of the public and is accompanied by reasonable persuasion. The strong arm of authority is used less frequently.

A uniform budget and accounting system for municipal departments of health was prepared by a New York State Committee in 1919<sup>4</sup>.

In prefacing its report, the committee made the following statements:

"Corrective comparative data about appropriations and expenditures by cities for public health work are not obtainable at the present time because:

(1) Of a lack of uniformity of budgets and departmental accounting systems.

(2) A misinterpretation or misconception of what are proper public health activities.

(3) Some cities so limit the amount to be raised by tax for municipal purposes other than health work, that they are compelled to include in health budgets the appropriation for activities which do not properly belong there.

"In the health budgets of some cities, appropriations for garbage, ash and rubbish collection and disposal, plumbing inspection, maintenance and operation of sewers and sewage disposal plants and other sanitary activities such as fumigation and inspection are included. In the health budget and departmental accounting system which we have prepared we have included only those activities which are now generally regarded by health authorities as proper health activities."

The budget proposed contains the following main headings:

- I. Administrative Expenses.
- II. Isolation of Patients.
- III. Public Health Laboratory.
- IV. Public Health Centers.
- V. Tuberculosis Clinic.
- VI. Child Welfare Stations.
- VII. Venereal Disease Clinic.

Subdivisions under each head are:

1. Salaries, wages and fees.
2. Materials and supplies.
3. Expenses.

As stated by Dr. Chapin<sup>5</sup>, "the older communities have now largely outgrown the first stages of public health work. The streets have been sewered, the privy vaults abolished and good water supplies, properly cared for, have been secured. The public works or engineering departments should look after the maintenance and extension of these improvements.

There are a vast number of minor nuisances connected with the care of cellars, lots, garbage disposal, dumps and defective drainage which it

is still the fashion of the health department to look after, though usually they have scarcely the remotest relation to health. All this should be turned over to the police department."

With the foregoing considerations in view, it becomes possible to compare more profitably the activities and appropriations of health departments in various cities. The functions and duties of health departments are essentially the same in all cities regardless of size. As a city increases in size, more and more subordinate officials are needed but every activity of the large health department should have its counterpart in the smaller organization.

In response to inquiries from Assistant Secretary Lee of the Duluth Commercial Club and the Vice Chairman of the Public Health Committee more or less complete replies have been received from seventeen cities.

The principal sub-divisions of their work were as follows:

1. Administration.
2. Vital statistics.
3. Education.
4. Laboratories.
5. Control of communicable disease.
6. Tuberculosis.

|               | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bridgeport.   | +  | +  | .. | +  | +  | .. | .. | .. | .. | .. | .. | +  | .. | +  | .. | .. | .. | .. | +  | +  | +  | .. | .. |
| Boston .....  | +  | +  | .. | +  | +  | .. | .. | .. | .. | +  | .. | .. | .. | .. | +  | .. | .. | .. | +  | +  | .. | .. | .. |
| Buffalo ..... | +  | +  | .. | +  | .. | +  | +  | .. | .. | .. | .. | +  | +  | .. | .. | .. | .. | +  | +  | .. | .. | +  | .. |
| Cleveland ..  | +  | +  | .. | +  | +  | +  | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | +  | +  | +  | .. | .. | .. |
| Chicago ....  | +  | +  | .. | +  | +  | .. | .. | .. | +  | +  | .. | +  | +  | .. | .. | +  | +  | +  | +  | +  | .. | .. | .. |
| Dallas .....  | +  | +  | +  | .. | +  | .. | .. | .. | .. | .. | .. | +  | .. | .. | .. | +  | .. | .. | +  | +  | .. | .. | .. |
| Dayton .....  | +  | +  | .. | +  | .. | .. | +  | .. | .. | .. | .. | .. | .. | .. | .. | +  | .. | .. | +  | +  | .. | .. | .. |
| Duluth .....  | +  | .. | .. | .. | +  | +  | +  | .. | +  | +  | .. | +  | .. | .. | .. | .. | .. | .. | .. | +  | +  | .. | +  |
| Milwaukee .   | +  | +  | .. | +  | +  | +  | .. | .. | +  | .. | +  | .. | +  | .. | .. | +  | .. | .. | +  | +  | .. | .. | .. |
| Minneapolis   | +  | +  | .. | +  | +  | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | +  | .. | .. | .. | .. |
| New York..    | +  | +  | +  | +  | +  | .. | .. | .. | +  | .. | +  | +  | .. | .. | .. | .. | .. | .. | +  | +  | .. | .. | .. |
| Reading ....  | +  | +  | +  | +  | +  | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | +  | +  | +  | +  | .. |
| Somerville .  | +  | +  | .. | +  | +  | +  | .. | .. | +  | .. | .. | .. | +  | .. | .. | +  | .. | .. | +  | +  | .. | .. | +  |
| Spokane ...   | +  | .. | .. | .. | +  | +  | .. | .. | +  | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | +  | .. | .. | .. |
| St. Louis...  | +  | .. | .. | +  | +  | .. | .. | .. | +  | +  | +  | .. | .. | .. | .. | +  | .. | .. | +  | +  | .. | .. | .. |
| Tacoma ....   | +  | .. | .. | +  | +  | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | +  | .. | .. | .. | .. |
| Youngstown    | +  | .. | .. | .. | +  | .. | .. | .. | +  | +  | .. | .. | .. | .. | +  | .. | .. | .. | +  | +  | +  | +  | .. |
| Total....     | 17 | 12 | 2  | 12 | 14 | 5  | 3  | .. | 8  | 5  | 3  | 6  | 4  | 1  | 2  | 6  | 1  | 2  | 15 | 14 | 4  | 3  | 2  |

From the table it can be seen that there is considerable variation in the scope of the work undertaken in different cities but that on the whole, health work throughout the country is developing along the lines mentioned in the preceding discussion.

It will be seen that the activities conducted by

7. Venereal disease.
8. Maintenance of general hospital.
9. Maintenance of contagious hospital.
10. Maintenance of small pox hospital.
11. Maintenance of tuberculosis sanatorium.
12. Child welfare.
13. School inspection.
14. Health centers.
15. Dental hygiene.
16. Division of nursing.
17. District physicians.
18. Maintaining of bath houses.
19. Sanitation.
20. Food inspection.
21. Garbage collection or reduction.
22. Plumbing and drainage supervision.
23. Cattle inspection.

None of the cities reported all the sub-divisions mentioned and some of them only a few. Letters were sent to a number of other cities but the replies received were not sufficiently detailed to admit of comparison with those inclined in the table.

The various cities sub-divided their work as follows, the numbers used, representing the sub-divisions enumerated above.

Note:—In the case of St. Louis it was not clear from the report whether the activities enumerated were all directed by the health department.

the health departments are usually classified as follows:

|                                       | Cities |
|---------------------------------------|--------|
| 1. Administration                     | 17     |
| 2. Control of communicable disease    | 14     |
| Special division for tuberculosis     | 5      |
| Special division for venereal disease | 3      |



|  |    |
|--|----|
| Maintenance of contagious hospital           | 8  |
| Maintenance of detention hospital            | 5  |
| 3. Child welfare                             | 6  |
| Special classification for school inspection | 4  |
| 4. Sanitation, nuisances, etc.               | 15 |
| 5. Food inspection                           | 14 |
| 6. Vital statistics                          | 12 |
| 7. Laboratories                              | 12 |

The above divisions therefore constitute the principal work of most health departments at the present time. Garbage collection or reduction was still assigned to the health department in 4 cities while in 3 the department had supervision of plumbing and drainage.

The expenditure for the work of these various sub-divisions was not always indicated. The following tables show the amounts used in certain cities:

## ADMINISTRATION

| City                   | Source of Information       | Population | Amount      | Per Capita |
|------------------------|-----------------------------|------------|-------------|------------|
| Boston                 | Annual Report, 1919.....    | 748,060    | \$46,004.92 | .061       |
| Buffalo                | Annual Report, 1919.....    | 506,775    | 22,373.26   | .044       |
| Cleveland              | Appropriation, 1920.....    | 796,836    | 6,650.00    | .008       |
| Chicago                | Appropriation, 1920.....    | 2,701,705  | 96,400.00   | .032       |
| Dallas                 | Budget, 1919-1920.....      | 158,976    | 9,527.44    | .059       |
| Duluth                 | Budget, 1921.....           | 98,917     | 7,600.00    | .077       |
| Milwaukee              | Budget, 1920.....           | 457,147    | 25,045.00   | .055       |
| Minneapolis            | Appropriation, 1920.....    | 380,582    | 17,582.00   | .046       |
| New York               | Budget, 1921.....           | 5,621,151  | 6,504.15    | .115       |
| Reading                | Budget, 1920.....           | 107,784    | 4,675.00    | .043       |
| Somerville             | Auditor's Report, 1919..... | 93,091     | 4,330.89    | .046       |
|                        |                             |            |             | .586       |
| Average 11 Cities..... |                             |            |             | .058       |

## COMMUNICABLE DISEASE

| City                    | Source of Information       | Population | Amount      | Per Capita |
|-------------------------|-----------------------------|------------|-------------|------------|
| Buffalo                 | Annual Report, 1919.....    | 506,775    | \$27,057.22 | .053       |
| Chicago                 | Appropriation, 1920.....    | 2,701,705  | 184,717.97  | .068       |
| Cleveland               | Budget, 1920.....           | 796,836    | 136,378.00  | .170       |
| Dallas                  | Budget, 1919-1920.....      | 158,976    | 395,266.00  | .024       |
| Duluth                  | Budget, 1921.....           | 98,917     | 20,455.00   | .206       |
| Milwaukee               | Budget, 1920.....           | 457,147    | 43,136.00   | .096       |
| Minneapolis             | Appropriation, 1920.....    | 380,582    | 9,768.00    | .025       |
| New York                | Budget, 1921.....           | 5,621,151  | 559,837.00  | .091       |
| Reading                 | Budget, 1920.....           | 107,784    | 1,034.00    | .009       |
| Somerville              | Auditor's Report, 1919..... | 93,091     | 7,689.03    | .071       |
|                         |                             |            |             | .813       |
| Average 10 cities ..... |                             |            |             | .081       |

## CHILD WELFARE

| City                   | Source of Information        | Population | Amount      | Per Capita |
|------------------------|------------------------------|------------|-------------|------------|
| Bridgeport             | Letter from H. O., 1920..... | 143,538    | \$37,313.31 | .260       |
| Buffalo                | Annual Report, 1919.....     | 506,775    | 70,065.47   | .014       |
| Chicago                | Appropriation, 1920.....     | 2,701,705  | 217,495.00  | .080       |
| Cleveland              | Budget, 1920.....            | 796,836    | 80,304.00   | .010       |
| Dallas                 | Budget 1919-1920.....        | 158,976    | 5,595.00    | .036       |
| Duluth                 | Budget, 1921.....            | 98,917     | 2,905.00    | .029       |
| Milwaukee              | Budget, 1920.....            | 457,147    | 48,849.00   | .115       |
| New York               | Budget, 1921.....            | 5,621,151  | 951,458.00  | .161       |
|                        |                              |            |             | .705       |
| Average 8 cities ..... |                              |            |             | .088       |

## SANITATION

| City                    | Source of Information    | Population | Amount      | Per Capita |
|-------------------------|--------------------------|------------|-------------|------------|
| Boston                  | Annual Report, 1919..... | 748,062    | \$72,464.03 | .096       |
| Buffalo                 | Annual Report, 1919..... | 506,775    | 38,046.38   | .075       |
| Chicago                 | Appropriation, 1920..... | 2,701,700  | 172,910.00  | .064       |
| Cleveland               | Appropriation, 1920..... | 796,838    | 60,170.00   | .075       |
| Dallas                  | Budget, 1919-1920.....   | 158,976    | 1,640.50    | .010       |
| Duluth                  | Budget, 1921.....        | 98,917     | 13,385.00   | .135       |
| Milwaukee               | Budget, 1920.....        | 457,147    | 48,725.00   | .015       |
| Minneapolis             | Appropriation, 1920..... | 380,582    | 9,768.00    | .054       |
| New York                | Budget, 1921.....        | 5,621,151  | 313,933.00  | .055       |
| Reading                 | Budget, 1920.....        | 107,784    | 3,775.00    | .035       |
|                         |                          |            |             | .614       |
| Average 10 cities ..... |                          |            |             | .061       |

## FOOD INSPECTION

| City                   | Source of Information       | Population | Amount      | Per Capita |
|------------------------|-----------------------------|------------|-------------|------------|
| Buffalo                | Annual Report, 1919.....    | 506,775    | \$37,701.77 | .075       |
| Chicago                | Appropriation, 1920.....    | 2,701,700  | 160,905.00  | .059       |
| Cleveland              | Budget, 1920.....           | 796,836    | 49,994.00   | .062       |
| Dallas                 | Budget, 1919-1920.....      | 158,976    | 11,766.80   | .077       |
| Duluth                 | Budget, 1921.....           | 98,917     | 8,725.00    | .085       |
| Milwaukee              | Budget, 1920.....           | 457,147    | 43,735.00   | .095       |
| New York               | Budget, 1921.....           | 5,621,151  | 332,223.00  | .059       |
| Reading                | Budget, 1920.....           | 107,784    | 3,675.00    | .026       |
| Somerville             | Auditor's Report, 1919..... | 93,091     | 5,930.74    | .063       |
|                        |                             |            |             | .604       |
| Average 9 cities ..... |                             |            |             | .067       |

## VITAL STATISTICS

| City                    | Source of Information    | Population | Amount     | Per Capita |
|-------------------------|--------------------------|------------|------------|------------|
| Boston                  | Annual Report, 1919..... | 748,060    | \$7,647.42 | .010       |
| Buffalo                 | Annual Report, 1919..... | 506,775    | 27,685.74  | .054       |
| Chicago                 | Appropriation, 1920..... | 2,701,705  | 50,370.00  | .018       |
| Cleveland               | Budget, 1920.....        | 796,836    | 7,029.00   | .009       |
| Dallas                  | Budget, 1919-1920.....   | 158,976    | 2,751.60   | .017       |
| Milwaukee               | Budget, 1920.....        | 457,147    | 6,523.00   | .014       |
| Minneapolis             | Appropriation, 1920..... | 380,582    | 4,380.00   | .011       |
| New York                | Budget, 1921.....        | 5,621,151  | 115,693.00 | .020       |
| Reading                 | Budget, 1920.....        | 107,784    | 1,080.00   | .010       |
| Somerville              | Annual Report, 1919..... | 93,091     | 1,131.74   | .012       |
|                         |                          |            |            | .175       |
| Average 10 cities ..... |                          |            |            | .018       |

## LABORATORIES

| City                   | Source of Information    | Population | Amount      | Per Capita |
|------------------------|--------------------------|------------|-------------|------------|
| Buffalo                | Annual Report, 1919..... | 506,775    | \$43,382.33 | .085       |
| Chicago                | Appropriation, 1920..... | 2,701,705  | 40,971.20   | .015       |
| Cleveland              | Budget, 1920.....        | 796,836    | 34,468.00   | .043       |
| Milwaukee              | Budget, 1920.....        | 457,147    | 17,645.00   | .038       |
| Minneapolis            | Appropriation, 1920..... | 380,582    | 9,240.00    | .024       |
| New York               | Budget, 1921.....        | 5,621,115  | 300,109.00  | .053       |
| Reading                | Budget, 1920.....        | 107,784    | 1,230.00    | .011       |
|                        |                          |            |             | .269       |
| Average 7 cities ..... |                          |            |             | .038       |

The averages obtained may be summarized as follows:

| Department                 | Cities | Average Annual Per Capita |
|----------------------------|--------|---------------------------|
| Communicable diseases..... | 10     | .081                      |
| Administration .....       | 12     | .049                      |
| Child welfare.....         | 8      | .088                      |
| Sanitation .....           | 10     | .061                      |
| Food inspection.....       | 9      | .067                      |
| Vital statistics.....      | 10     | .018                      |
| Laboratories .....         | 7      | .038                      |
|                            |        | .402                      |

## DEPARTMENT

Most of these cities spend additional sums from their health budget for certain of the other purposes enumerated above, which have more or less relation to either public health or municipal house cleaning.

The total budget for 1921 of one city of about 100,000 population contains the following items:

|  | Per Capita |
|--|------------|
| General administration.....\$ 7,600.00   | .077       |
| Communicable diseases..... 16,900.00     | .170       |
| Prevention of tuberculosis..... 3,555.00 | .036       |
| Child welfare..... 2,905.00              | .029       |

|   |              |       |
|---|--------------|-------|
| Sanitation and nuisance preven-<br>tion ..... | 13,385.00    | .135  |
| Bakery inspection.....                        | 1,745.00     | .018  |
| Meat inspection.....                          | 1,780.00     | .018  |
| Milk and dairy inspection.....                | 5,200.00     | .052  |
| Isolation Hospital.....                       | 6,035.00     | .061  |
| Contagious Hospital.....                      | 18,385.00    | .196  |
| Cattle Inspection.....                        | 4,985.00     | .050  |
| Incineration .....                            | 12,925.00    | .130  |
| New equipment.....                            | 11,360.00    | .115  |
|   | <hr/>        |       |
|   | \$106,760.00 | 1.087 |

This city is spending this year (1921) \$106,760.00 for the work of the health department or \$1.09 per person. Many cities are not spending nearly as much but, as said before, totals are difficult of comparison on account of differences in the work assigned to the health department in different cities. A large per capita expenditure through the health department does not necessarily mean expenditure for public health purposes in the modern sense of the term.

In Framingham, Massachusetts before the Community Health and Tuberculosis Demonstration began in December 1916 the annual ex-



penditure was forty cents per capita". Now the community is spending \$2.00 per capita annually from both public and private sources. In the view of Dr. Armstrong, the executive officer of the Demonstration, for a city of 100,000 population the annual health budget should be at least \$200,000 a year from both public and private sources.

The Russell Sage Foundation in its survey of the activities of Municipal Health Departments in the United States published in 1916<sup>10</sup>, recommended a one dollar per capita appropriation for real preventive measures as desirable although a dollar was then worth much more than it is today.

If used strictly for health purposes in the present sense of the term, the 1921 appropriation of the city referred to would be considered fairly ample; but further analysis of the provisions of the budget indicate that it is insufficient. Thirteen and a third cents per capita are used for an incinerator which should be taken care of under another department. The maintenance of hospitals should probably not be a charge against the health fund and this amounts to twenty-seven cents more. The amount spent for food inspection is higher than the average in the other cities and the amount for sanitary inspection and nuisances is considerably more than the average. In all about \$50,000.00 is included in the health fund for these various purposes which properly should be provided from some other fund or source. If the same amount were assigned to the health department for public health work of the character now considered most valuable, the department could extend its activities along such lines. It would have more to spend for the prevention of infant mortality and the promotion of child welfare; it could provide for health centers, employ more nurses, establish nutritional clinics, extend its tuberculosis and venereal disease work especially as regards the follow-up of patients coming for diagnosis or discharged from institutions, to see that treatment at public expense did not fail of results in permanent improvement of health; it could promote healthful conditions among the workers and in general do work that will have more influence in reducing the death rate than the inspection of nuisances or the destruction of garbage. A good beginning

has been made along several of these lines but development of the work has been hampered by lack of funds.

It will be noted that this city spends a larger amount for the control of communicable disease than the average expenditure in nine other cities. This is to the credit of the city if properly used. The appropriation for child welfare should be much larger than at present even though it is true that a considerable additional amount (about \$13,000.00) is now expended through the Board of Education for school inspection.

*Hospital Provision.*—Treatment of patients in hospitals is necessary and desirable and it is right that public funds should be spent to aid in their maintenance. Special hospitals for contagious disease and tuberculosis are needed in every large community but the money spent in providing proper care for those suffering from disease should not be deducted from nor absorb the funds needed for other preventive measures. The approximate amount now furnished by public taxation toward the support of the hospitals of Cleveland, Ohio, is \$1,086,000.00. The Cleveland Hospital and Health Survey<sup>1</sup>, however, recommends the addition of 1500 beds to the hospital capacity of Cleveland including both general and special hospitals and this would undoubtedly increase considerably the need of municipal expenditure for hospital purposes, making due allowance for all income and gifts. The maintenance of a tuberculosis sanatorium is a necessary health measure but the expense of conducting the institution should not be deducted from the health departments budget and the same principle holds good regarding contagious hospitals.

One may, however, look forward to the day when, as the result of adequate expenditures for prevention of disease, less outlay will be needed for hospitals.

According to the Cleveland Survey<sup>1</sup> there should be about five beds for each 1,000 of the population served. The same quota is used in New York and Boston Health plans<sup>1</sup>. A city of 100,000 which is a medical center for a population two or three times as large, should probably have about 1,000 hospital beds even when allowance is made for some hospital provision in smaller cities in the same area.

*Nursing.*—According to Dr. Armstrong of the Framingham Demonstration", an adequate nursing service for a community requires the employment of at least one visiting nurse, or public health nurse, for each 3,000 people.

The Cleveland Hospital and Health Survey recommends the same rate<sup>1</sup>.

The Committee on Sickness in Dutchess county, New York, recommended the employment of 35 trained visiting nurses for a population of 88,225<sup>2</sup>.

Allowing one nurse to every 3,000 people, a city of 100,000 should have about thirty three visiting nurses.

These nurses are needed for the adequate follow-up of patients with venereal disease and tuberculosis, for the extension of child welfare work, for assistance in clinics and health centers and for the education of the public in healthful living. In short, they are indispensable agents in the new public health work.

*Health Centers.*—Eight health centers are operated by the city of Cleveland. Various clinics including tuberculosis, child welfare and dental clinics are regularly held there. Such centers should serve as headquarters for the visiting-nurse work and as means for coordinating the health work of private organizations. The Cleveland Survey states that these centers meet a real need and that one should be provided for each 50,000 of the population.

Similar centers are being started by the American Red Cross for demonstration purposes throughout the country. The cooperation of the local Red Cross Chapter, the County Medical Association and the County Public Health Association can easily be counted upon in the starting of such enterprises.

*Industrial Hygiene.*—The Cleveland Health and Hospital Survey recommends that there be established within the municipal division of health a bureau of industrial hygiene. The functions of such a bureau would be to study the health needs of various industries, cooperate in an advisory capacity with industrial nurses and physicians, assume responsibility for the maintenance of the health of city employes, of food handlers, operators of public conveyances and in all possible ways aid the efforts of employers and labor unions to secure healthful

working conditions. If the time has not yet come for the establishment of such a bureau in a city, there should nevertheless be continuous study of industrial needs as regards public health and provision for meeting them.

*Laboratory and Vital Statistics.*—Accurate data should be available concerning the prevalence and severity of the various preventable diseases. The furnishing to physicians of laboratory help in making prompt and accurate diagnosis of diseases is therefore a necessary preliminary to combating them successfully. The provision of such facilities without charge is not charity but public health protection.

The records of even the ordinary routine tests furnish valuable statistical material but every city laboratory should be a reasonable research center as well as a diagnosis station.

The correlation and interpretation of the results of the various tests and studies made and of the various reports included under the head of vital statistics, require the employment of trained statisticians and investigators if the statements given out regarding health and disease are to be reliable and useful.

*Education.*—The education of the public regarding health protection is being given a larger place in the public health program than formerly. Every means known to the professional advertiser for spreading information is considered legitimate, including the free use of printers ink, of bill boards, moving pictures, county fair booths, special exhibits, health clowns, etc., but the health department as well as the lay crusader should keep close to facts and not bring discredit on the whole movement by exaggerated or misleading statements.

Truth in advertising is as important in public health work as in any wholesale or retail business and the public demands it.

*The Place of Unofficial Organizations in Public Health Work.*—Private organizations can be of the greatest assistance to the health department in securing public support for up-to-date measures. Health committees of commercial bodies, Rotary clubs and similar organizations have here a great opportunity. It is well that the health activities of all such organizations should be correlated with those of a volunteer public health association. The principal func-



tion of such an association are the studying of methods and furnishing to the public of reliable information on health matters. Where necessary the value of new forms of public health work may be demonstrated at the expense of the association but as soon as proven, the community as a whole should be urged to assume responsibility for their continuance.

The Report of the Investigation of Sickness in Dutchess county, New York, by the State Charities Aid Association recommends the establishment of a County Public Health Association to bring about cooperation on the part of existing organizations which, in most instances, are doing their work well in separate fields, as one of the most important measures needed to improve the health of the county.

The Cleveland Hospital and Health Survey Report (Part 2 p. 228) contains the following statement: "It is believed to be of great importance that a Cleveland or Cuyohoga County Public Health Association be formed to give direction and more effectiveness to the efforts of all the public and private agencies in the field."

In Minnesota the County Public Health Associations have just this field, their work being supported by the sale of the Christmas seals. Such an organization has a relation to the City and County official health organization similar to that which a Chamber of Commerce or Commercial Club holds to the city government. It is the function of the volunteer organization to study methods, demonstrate their value, educate the public and in general to stand behind the city and county government.

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#### POST-OPERATIVE INTESTINAL OBSTRUCTION\*

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By the term "post-operative obstruction" we mean that form of acute obstruction which immediately follows or is a direct result of an abdominal operation. Intestinal obstruction is one of the most frequent of the serious complications which follow operations on the abdomen. G. Brown Miller of Johns Hopkins Hospital reports eleven cases of intestinal obstruction in 1200 consecutive operations, 770 of which were abdominal cases, finding about one case of obstruction in 128 operations in which the abdominal cavity was opened. This is a fair index of the frequency of the condition.

#### ETIOLOGY

In a large number of cases of post-operative obstruction the condition is caused by intestinal adhesions. In simple, clean cases primary union takes place and, as a rule, no adhesions form. In a large percentage of the cases, in which the peritoneal cavity is invaded by micro-organisms, adhesions do form and obstruction may take place. Obstruction may arise from pre-existing adhesions, which have been separated at operations leaving raw surfaces which cannot be covered by peritoneum; or, they may form where raw surfaces are left as a result of operation; or, may form as a result of local peritonitis following infection. Mechanical injury, hemorrhage, and the like, no doubt, produce adhesions which may cause obstruction. Previously existing suppurative conditions in the peritoneal cavity, such as perimetritis, metritis, suppurative inflammation of the gall bladder, kidney, appendix, etc.,

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are no doubt conducive to intestinal adhesions which, in turn, may cause intestinal obstruction. If these adhesions are slight or if the gut is fixed in a favorable position the symptoms of obstruction do not arise. Treves makes the following classification as to causes of post-operative obstruction:

First—Strangulation over a band.

Second—Occlusion brought about by kinking, due to traction by an isolated band or adherent diverticulum.

Third—Occlusion affected by adhesions which retain the bowel in a bent position.

Fourth—Obstruction by means of adhesions which compress the gut.

Fifth—Obstruction by the matting together of several coils of intestine.

Sixth—Narrowing of the bowel lumen from shrinkage of the mesentery after inflammation.

In the first variety a vermiform appendix, a Meckel's diverticulum, epiploic appendage, Fallopian tube, may become adherent at its extremity to the gut, and thus form a band or cord which can compress a loop of intestine beneath it; or the intestine may be snared by this false ligament and thus form an obstruction.

Secondly, in the occlusion brought about by acute kinking due to traction, a band of adhesion becomes attached to a portion of the bowel, and, by dragging upon this point, produces acute kinking and subsequent occlusion.

Third, here an adhesion retains the bowel in a bent position, the bowel being adherent to some part of the pelvic or abdominal wall and thus causes more or less of an occlusion or resistance to peristaltic movement, and consequently forms an obstacle to the passage of intestinal contents. As the bowel contents accumulate above this point the kink tends to tighten and increases the obstruction and finally a complete stenosis occurs and symptoms of obstruction appear.

In the fourth variety, bands of adhesions are found which involve the more fixed portion of the intestine and the adhesions are more or less fixed to the pelvic or abdominal parietes.

Fifth, obstruction caused by the matting together of several coils of intestine is believed to be the most frequent cause of post-operative obstruction. These coils may be adherent to each other and to the parietes or the pelvic viscera.

The small intestine is usually involved but at times the sigmoid flexure and occasionally coils of the large and small intestine may be adherent to each other.

Sixth, narrowing of the bowel by shrinkage of the mesentery is usually the result of some acute inflammation involving the mesentery with the formation of a scar, and due to its contraction, there is a decided lessening of the intestinal calibre. However, this type of obstruction is rarely met with as a result of operation.

Volvulus, too, may be considered a source of post-operative obstruction where the intestine is drawn by a band of adhesions which give rise to a sort of pedicle over which a volvulus may form.

Intussusception has been held to be a cause of post-operative ileus but this condition is very rare.

Olshausen reports intestinal obstruction following the catching of a loop of the gut with a suture in closing the abdominal wound.

Post-operative hernia caused by premature absorption of the sutures allowing separation of the incision may cause an obstruction.

It is also stated that fecal accumulation, not due to adhesions, may cause obstruction because of the hard fecal matter in the lower bowel. This is particularly to be seen where one is not able to give an enema as in cases where an operation has been performed on the rectum, or for the repair of a complete tear of the perineum.

#### PATHOLOGY

From the foregoing, we find that the cause of intestinal obstruction is usually mechanical, that several different mechanisms may be responsible, and that angulation is a necessary factor.

Mechanical obstruction if not relieved leads to dynamic obstruction by over-distension and paralysis.

In simple mechanical occlusion of the lumen of the bowel the portion below is empty and contracted, the portion above is distended with gas and feces (stagnation meteorism) without circulatory disturbances. But as the distention increases, local meteorism develops due to the disturbance of circulation.

A.—Venous hyperemia—because veins are easily compressed, the resultant stasis produces a dark livid color, a tumefaction of the walls,



with exudation of serum into bowel and later into the peritoneal cavity.

B.—Muscular paralysis occurs in from 4 to 6 hours as a result of circulatory disturbances.

C.—Local meteorism ensues which produces further distention because of gas evolution.

D.—Thrombosis in mesenteric vessels, gangrene and perforation may result if death is not caused by absorption of toxic products.

In obstruction of an intestinal loop, the circulatory disturbance begins earlier, distention is rapid, the tissues are deeply congested and dark blue in color; ecchymotic spots appear and the mucosa and underlying tissues become the seat of gangrenous inflammation and an ideal location for the growth of bacilli of maglinant edema and bacilli coli communis.

In either case the pathological condition rapidly progresses from a very limited area, causing nervous and circulatory disturbances throughout the alimentary canal, invading the peritoneum and shortly affecting all the organs of the body.

The cause of death in acute post-operative obstruction is usually a chemical intoxication, resulting from absorption of the products of protein disintegration in the area involved as is manifest by lowered blood pressure, disturbances of temperature, vomiting, diarrhea, impaired kidney function, the congestion of duodenal and jejunal mucosa, collapse and death.

#### SYMPTOMS AND CLINICAL FEATURES

The clinical picture is not always characteristic or constant and obstruction varies greatly as to time of occurrence with reference to operation. There can be no question but that adhesions begin to form immediately after operation. The symptoms of post-operative obstruction usually make their appearance during the first two weeks succeeding operation. Most of our cases have shown symptoms of obstruction on the third day after operation, though one patient did not have any symptoms for two weeks after removal of a pus appendix, at which time it was thought safe for him to leave the hospital. However, the symptoms on the third day are often so vague that one hesitates in making a diagnosis of obstruction. One hesitates to make such a diagnosis because we do see other conditions which give a symptomatology similar to post-operative obstruction, and we hesi-

tate, indeed, to subject a patient to another operation for a condition which may not be obstruction. We are very prone, it seems to me, to say the patient is suffering from dilatation of the stomach or what not. Consultation does not always clear the air; consultant and operator may both be at sea.

We must always bear in mind the possibility of an intestinal obstruction in our post-operative cases when we find persistent vomiting, an increasing distention, epigastric distress and increasing pulse rate that do not respond to gastric lavage, enemata and proper administration of cathartics. The onset is usually insidious, passing gradually from the usual post-operative phenomena to those of acute obstruction. Early manifestations are epigastric distress, slight watery regurgitation, a distressed or "fixed" facies. The features may be drawn and pinched though the eyes may be bright and clear. The patient may or may not look very ill. The anxious expression may or may not be seen. The temperature does not usually go above normal, more frequently is slightly subnormal. Abdominal pain is seldom complained of unless colon is involved and is frequently absent. Instead of actual pain, there is usually an emphasized epigastric fullness with pressure symptoms and distress, with difficulty in breathing, shortness of breath which may be temporarily relieved by gastric lavage or vomiting. There is an absolute absence of rigidity. The peristaltic waves may pass the point of obstruction but the contents do not. As soon as peristalsis is strong enough a single large movement may empty the bowel below the obstruction. The distention, vomiting and distress or pains are not relieved by this evacuation.

The extremities soon become blue, cold, clammy, although the rest of the body seems warm. The patients often state they are feeling quite comfortable and they usually fail to realize the gravity of the situation. Vomiting or regurgitating mouthfuls of brown fluid with a fecal odor almost continuously without retching or effort soon becomes manifest. Should this fluid accumulate in the stomach for some hours it will be ejected in larger quantities and give apparent temporary relief. Let us not be misled by the absence of vomiting early in obstruction. This

happened in one of our cases; vomiting did not begin until shortly before death.

#### DIAGNOSIS

##### Intestinal Obstruction

1. Visible and palpable peristalsis as a rule present in obstruction only.

2. Feculent vomiting only when complete obstruction obtains. Incomplete obstruction may have

- a. Flatus and feces.
- b. Purgatives, enemata give relief.
- c. Presence of feces in rectum relieved by enemata or purgatives.

3. Meteorism extreme, moderate or none.

4. Persistent vomiting.

5. Absence of rigidity.

6. Presence of borborygmi.

7. Slow pulse until late.

8. Normal or low leucocyte count.

#### DIFFERENTIAL DIAGNOSIS

In the group of cases developing obstructive symptoms in the course of a few days after an abdominal operation the purely obstructive symptoms may be masked by those usual in post-operative conditions. The problem here is to differentiate the two conditions, a not always easy or possible task. Time must not be lost in predetermining the location of obstruction or its character. The main fact in the diagnosis is the obstruction. It is sometimes a relief to realize that many of the conditions closely simulating acute obstruction also require surgical relief.

*Appendicitis with rupture, Renal or Biliary Calculi, Lead Colic, Ruptured Gastric or Duodenal Ulcer, Ovarian Cyst* with twisted pedicle, may be easily differentiated by the surgeon from the previous history, operative findings, etc., in any particular case.

*Gastric Crises*—a history of syphilis, a very sudden onset, the urgent vomiting, and the rise in blood pressure will usually differentiate.

*Henock's Purpura* is very rare, and gives a helpful history.

*Hernia*—usually shows itself in the common hernial openings if careful digital search is made, though difficulty may be experienced if hernia is in one of the peritoneal pouches. However, surgical relief is indicated.

*Acute Dilatation of the Stomach* may closely simulate post-operative obstruction, though it is

rare, and usually occurs at or immediately following operation.

*Mesenteric Thrombosis or Embolism*.—The history or clinical findings of primary heart disease or primary abdominal disease, with marked pain, often muscular rigidity with an unusual restlessness may help one to decide on a diagnosis.

*Acute Pancreatitis*—presents a very similar symptomatology, but flatus usually is passed without difficulty; stools may be passed; the condition occurs more often in the stout middle aged patients with history suggestive of biliary calculi. The pain may be sharp and excruciating while the abdomen may be supple.

*Peritonitis*—in this condition vomiting is usually more active, pain is more severe, the Hippocratic facies, retracted abdomen, with rise in temperature and leucocytosis are valuable aids in diagnosis.

*Intussusception* is met with more often in children; a mass is usually evident, with the passage of mucus and even blood.

In general it may be said that the more severe the vomiting, and the earlier the onset, the higher the obstruction. If distention is severe, the colon is most likely involved. If distention is acute the probabilities favor volvulus. If distention is slight the obstruction may be in jejunum or duodenum. If the distention is more in the central portion of the abdomen, the ileum and cecum are more likely to be involved. Vomiting is likely to be more severe if the obstruction is due to bands or an internal hernia. Shock and collapse are more marked when the obstruction is high. Strangulation causes the most severe symptomatology. In case of doubt it is always a safe rule to operate.

#### PROGNOSIS

The prognosis in post-operative obstruction is always grave and depends entirely on the time at which operative correction takes place. There are few surgical conditions which call for earlier operation than post-operative mechanical obstruction. If a certain stage is passed, as we can understand from the pathology of the condition, the relief of the obstruction does not save life. Most of the authorities consulted give mortality in operations for the relief of obstruction from 50 per cent to 75 per cent.



In the November issue of the "Annals of Surgery", Edward C. Van Buren, Jr., presents a paper on acute mechanical ileus wherein he states that, with certain exceptions, if the case is one of really acute mechanical ileus—the longer the patient lives with this condition prior to operative procedure, the sooner he dies afterward. He further states that everyone knows this but almost everyone acts as if he had forgotten it when confronted with a case of obstruction occurring during the convalescence of a patient upon whom he had operated for some other condition. He has performed some interesting experiments on dogs in five of which on examination 48 hours after experimentation only one showed any gross pathology. In eight which were examined 72 hours after obstruction all showed gross lesions or damage. From his observations he concludes that the 72 hour period is a critical time and he urges early operation. He had a mortality of 25 per cent in cases operated early, before 48 hours; and a 75 per cent mortality after 72 hours had elapsed. He says further that on the basis of such evidence one feels justified in urging early operation, exploratory, if you like, in cases of suspected acute ileus without waiting for an absolute positive diagnosis.

#### TREATMENT

*Prophylaxis.*—The prophylaxis of obstruction is the most important. All abdominal cases should be carefully handled. The use of picro acid preparation for the skin rather than iodine or if iodine is used, towels clamped on the skin edges and keeping gloved hands out of bichloride solution will help in preventing adhesions. The intestines should be handled as little as possible. Injury to abdominal wall by means of retractors should be avoided. All raw surfaces should be covered over with peritoneum. The closing of the abdomen should be done very carefully, the edges of the peritoneum being accurately opposed. The proper adjustment of the omentum over intestines and any other surface is of great value. One should try to place or replace the intestines as nearly as possible in their normal position. Some operators fill the abdominal cavity with normal saline after the operation, thus allowing the intestines to adjust themselves by floating around, and to thus pre-

vent obstruction, even though adhesions do form. The early evacuation of the bowels likewise tends to prevent obstruction. The value of pituitrin in these cases is not to be overlooked. In our Clinic we use 0.5 c. c. surgical pituitrin every six hours beginning about 4 hours after operation; especially is this done where adhesions have been encountered at operation. We believe we have seen good results following its use.

*Medical.*—Medical threatment is negligible except perhaps the intravenous or subdermal injection of normal saline, with the addition of adrenalin. The value of pituitrin is noticeable in prophylaxis.

*Surgical.*—After the diagnosis has once been no time should be lost in attempting to relieve obstruction. Personally, I do not believe that one should wait for the classical picture for a definite diagnosis; in fact, in the future I shall operate as soon as I feel fairly confident that obstruction exists. After operative correction is started it is well to at once go to the point of obstruction. It is a good plan to examine in a systematic manner the areas which were operated. For instance, the pelvis first; if the obstruction is not found here, look at the right iliac fossa near the cecum; if nothing is found here then go to the left side to the sigmoidal region. If, as is frequently the case, one finds loops of distended bowel one may hunt along the bowel until the collapsed portion is found which marks the point of obstruction. The adhesions should be carefully separated and the condition of the gut examined. Where the gut is at all gangrenous it is necessary to do one of two things: either to resect the bowel or to bring the gangrenous portion of the bowel out of the abdominal cavity making an artificial anus by suturing the bowel to the abdominal wound. This should not be done, however, until all the adhesions have been found and liberated. At times it may be necessary to empty the abdominal contents at once. This is especially true in cases with great distention even though the intestines be not gangrenous. The gut should be freely opened so as to allow the escape of the intestinal contents which are very toxic. A tube can then be placed within the lumen of the bowel and sewed into place; covering the tube with a portion of omentum is of great value. Tube drainage serves several

purposes: at first, it allows the decomposing poisonous contents of the bowel to escape; second, it relieves the disturbance to the circulation of the bowel; third, it allows the intestine to be replaced more easily into the abdominal cavity when the operation is finished; fourth, it alleviates the discomfort of the patient. As it is necessary to be careful in protecting the abdominal cavity from infection, the opening in the gut must be closed and left on the outside if need be. Puncturing of the bowel with a small aspirating needle is of no practical value.

#### CONCLUSIONS

1. Post-operative obstruction while less common than formerly occurs far too frequently and deserves serious consideration.
2. The outstanding etiological factors are adhesions.
3. The diagnosis and differential diagnosis is often difficult and requires close observation and study of each case individually.
4. The prognosis is dependent on early diagnosis and prompt surgical relief after diagnosis.
5. The most important part of treatment lies within the field of prophylaxis, the strict observance of fundamental principles as gentle handling of tissues, surgical cleanliness, exclusion of peritoneal irritants, unprotected gauze drains and the like.
6. Early surgical intervention with measures tending to support the adrenal system is the only salvation when post operative ileus presents itself.
7. When in doubt operate.

NOTE:—Since the presentation of this paper our attention has been called to the work of Louria, (*The Blood Urea Nitrogen in Acute Intestinal Obstruction*, *Arch. Int. Med.* 27: 620, May, 1921). Blood urea nitrogen of 45 mgms. or over in acute abdominal conditions, in absence of chronic kidney disease, strongly points to acute obstruction, acute peritonitis, or acute pancreatitis. One of our recent cases showed an increase to 66.5 mgms. blood urea nitrogen. We believe this test merits further study.

## SPINAL CORD MANIFESTATIONS IN PERNICIOUS ANEMIA\*

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Notwithstanding the numerous references in the literature on this subject, it does not seem amiss to call attention to the fact that pernicious anemia is always to be considered when dealing with cord disorders, particularly the combined scleroses, for it happens not infrequently that cases of pernicious anemia with predominating nervous symptoms go unrecognized until the symptoms of anemia make their appearance.

In approximately seventy-five per cent of the cases of pernicious anemia, a careful physical examination will reveal some evidence of involvement of the central nervous system, and it is not uncommon to see patients in whom the spinal cord manifestations precede and overshadow the symptoms produced by the anemia. It is in these cases in which the nervous symptoms dominate the clinical picture that we are likely to err in our diagnosis.

Nonne was the first to describe the degenerative changes in the spinal cord in pernicious anemia. This observer found pathological changes in the cords of ten out of seventeen cases. Degeneration as a rule begins with the formation of small areas of sclerosis principally located in the white matter of the cord and in a majority of the cases the posterior half shows more involvement, giving rise to symptoms referable to the lateral and posterior tracts. However, in some cases the anterior portion of the cord may be involved. Ultimately these sclerotic plaques by confluence and further degeneration results in diffuse and extensive changes taking place in the white matter, to which the term of subacute combined sclerosis is given. It is the consensus of opinion that the pathologic changes found in the cord in pernicious anemia are due to a toxic process which reaches the cord by way of the vascular system, giving rise to hemorrhagic or interstitial changes resulting in a more or less marked sclerosis. The cause of this toxic process or the etiology of pernicious anemia is still unknown.

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A large percentage of the patients with pernicious anemia will give a history of paresthesia, described as tingling, numbness, soreness, feeling of largeness and other abnormal sensations in the extremities, particularly the lower. Woltman in an analysis of 150 cases states that in 80 per cent, paresthesias were present regardless of whether or not involvement of the nervous system could be demonstrated objectively.

In the cases showing nervous symptoms but in which the symptoms of anemia predominate and precede those referable to the spinal cord, the diagnosis of pernicious anemia with cord changes as a rule is not difficult. Here we have more or less pronounced anemia with its associated symptoms such as general muscular weakness, lassitude, dyspnea on exertion, and gastro-intestinal disturbances to direct our attention to the necessity of having an accurate blood examination made.

The cases we are likely to have difficulty in diagnosing properly are (a) those in which the spinal symptoms appear early and overshadow those produced by the anemia, and (b) in the moderately advanced or advanced cases with progressive spinal symptoms during a remission of the disease in which the blood picture approaches normal. In Woltman's series approximately 13 per cent of the patients came for the express purpose of seeking relief from symptoms referable to the nervous system and of these symptoms the paresthesias were the most frequently encountered. If the paresthesias are of a more or less painful character, which is often the case in the early stages of the subacute combined degenerations, and on a casual physical examination no findings to account for them are elicited, these cases are likely to be carelessly diagnosed as "neuritis" or "muscular rheumatism."

Aside from the paresthesias, we also find patients with pronounced subjective and objective spinal symptoms. Cabot divides these cases roughly into two clinical groups: first, those having a spastic gait with increased reflexes and a greater or lesser degree of paralysis, and secondly, those having symptoms simulating tabes, with absent or diminished reflexes and a fairly marked ataxia. The latter group comprises the majority of the cases. Besides these two types,

there may be a combination of the two, in which a spastic ataxic condition is present, and occasionally a case in which the clinical picture is not unlike that of a multiple neuritis. To call attention to the difficulty in recognizing these conditions without careful and thorough study, it may be of interest to give the history and findings in three of the cases we have had under observation during the past year.

*Case I.* (5526-A) Miss K, age 55 school teacher. Entered the hospital April 22, 1920, complaining of great difficulty in walking due to stiffness and weakness in the lower extremities. She had no urinary symptoms and no gastro-intestinal disturbances except constipation. Family history negative. For 2 years she had been troubled with pain in both knees and legs. In September 1919 she began to notice stiffness in the knee joints and feet and about 3 months previous to entering the hospital began to have difficulty in walking. Patient had been under the care of physicians at various times for one year previous to her admission, but no blood examination was made except a Wassermann and this was found to be negative. Evidently lues was suspected in this case because of the gait disturbance.

**Physical Examination:** Fairly well preserved elderly female. The skin and mucous membranes were somewhat pale. Mentally she was sluggish and her memory was poor. Pupils were equal and reacted to light and accommodation. There was extreme muscular weakness of the lower extremities. The gait was spastic. Knee jerks were exaggerated. Patellar and ankle clonus were present on both sides. Proprioceptive and epicritic sensibilities were diminished over both lower extremities. Blood pressure: systolic, 140; diastolic, 65. Routine urinalysis was negative except for trace of albumen. Blood examination: Hemoglobin 68 per cent; R. B. C. 2,850,000; Color Index 1.2; Leukocytes 6,400; Pn. 50 per cent; Small lymph. 31 per cent; Large lymph. 16 per cent; Basophiles 1 per cent; Eosinophiles 2 per cent. A few megaloblasts and microcytes were found and poikilocytosis was quite marked. Blood and spinal Wassermann tests were both negative. There was a rather rapid and progressive development of paralysis of the lower extremities in this case, and control of the bladder was lost about 15 days after her admission to the hospital. Patient left the hospital on May 10th, 1920, and died at her home six weeks later.

*Case II.* (224-A) J. A. age 54, farmer. Referred by Mayo Clinic in April 1920, with diagnosis of pernicious anemia with early cord changes. The patient states that he first noticed numbness and weakness in the lower extremities in May 1917. Over a period of 3 years he had consulted a number of physicians and had taken baths for rheumatism at several health resorts. His chief complaint and the one which had proved quite annoying for one year previous to com-

ing under our care, was a soreness over the weight-bearing surfaces of both feet. He also stated that he had a "feeling of largeness" in both legs. There were no gastro-intestinal symptoms except constipation. Personal history was negative except that he had had nasal trouble for years. Patient was fairly well developed and nourished. Skin and mucous membranes were slightly anemic and there were eczematous lesions over the dorsum of both hands and over the lower half of both legs. Eyes: Pupils were miotic but regular in outline and reacted sluggishly to light and accommodation. Nose: Polypoid degeneration of right midturbinate and polyps in left nares.

Knee jerks and Achilles reflexes diminished but equal. Questionable Babinski left side. Diminished

tactile pain and thermal sensations over both lower extremities. Joint sense also impaired. No paralysis or muscular weakness noted but gait suggested a slight ataxia present. Blood and spinal fluid Wassermanns were both negative. Fractional gastric test meal showed an absence of free hydrochloric acid. Blood examination—as shown in accompanying table.

Clinical course: With the administration of Blands with arsenic and dilute hydrochloric acid, the patient did very well until the latter part of August 1920 when he began to complain of difficulty in walking and with cold sensations over lower abdomen and thighs. These symptoms, especially the former, gradually became more pronounced, although the blood picture showed a gradual improvement.

Table I

| Case 2—J. A.        |        | Hemo-<br>globin. | Erythro-<br>cytes. | Color<br>Index. | Leuco-<br>cytes. | Pn. | Small<br>Lymph. | Large<br>Lymph. | Eosophil. | Eosino-<br>phil. | Poikilo-<br>cytosis. | Anisocytosis. | Normo-<br>blasts. |
|---------------------|--------|------------------|--------------------|-----------------|------------------|-----|-----------------|-----------------|-----------|------------------|----------------------|---------------|-------------------|
| April 26, 1920..... | 70%    |                  | 3,120,000          | 1.1+            | 6,200            | 72  | 25              | 3               | 0         | 0                | +                    | +             | 0                 |
| June 26, 1920.....  | 80%    |                  | 3,168,000          | 1.2—            | ....             | ..  | ..              | ..              | ..        | ..               | slight               | 0             | 0                 |
| Aug. 13, 1920.....  | 80-85% |                  | 3,848,000          | 1. +            | ....             | ..  | ..              | ..              | ..        | ..               | slight               | slight        | 0                 |
| Sept. 2, 1920.....  | 80%    |                  | 4,112,000          | 1.              | 7,200            | 45  | 41              | 6               | 6         | 2                | +                    | +             | 0                 |
| Sept. 20, 1920..... | 80%    |                  | 4,336,000          | 1.1+            | ....             | ..  | ..              | ..              | ..        | ..               | slight               | 0             | 0                 |
| Oct. 15, 1920.....  | 85%    |                  | 4,272,000          | 1.              | 12,600           | 50  | 47              | 2               | 0         | 1                | +                    | 0             | 0                 |

On our last examination of the patient October 18, 1920, the gait was that of a typical tabetic. The knee jerks were very feeble. Romberg was present. Sensory findings were practically the same as elicited on the first examination. A recent letter from the patient states that there has been no change in his condition since last October.

Case III. (23375-A) H. O., age 33, farmer, was admitted to the hospital April 27, 1920, with history of progressive general weakness of one year's duration and with loss of 40 pounds in weight. He also com-

plained of numbness in hands and feet and constant chilly sensations over the body. Occasionally he was troubled with an annoying unproductive cough.

Examination revealed a very anemic and undernourished individual. Lungs were clear, and cardiac findings were negative except for a soft systolic murmur at the apex. No definite neurological changes were noted. Blood and spinal fluid Wassermann reactions negative. Free hydrochloric acid was absent in gastric test meal. Urinalysis was negative. The blood findings made the diagnosis of pernicious anemia an easy matter.

Table II

| Case 3—H. O.       |     | Hemo-<br>globin. | Erythro-<br>cytes. | Color<br>Index. | Leuco-<br>cytes. | Pn. | Small<br>Lymph. | Large<br>Lymph. | Eosophil. | Eosino-<br>phil. | Poikilo-<br>cytosis. | Anisocytosis. | Normo-<br>blasts. |
|--------------------|-----|------------------|--------------------|-----------------|------------------|-----|-----------------|-----------------|-----------|------------------|----------------------|---------------|-------------------|
| Apr. 28, 1920..... | 50% |                  | 1,888,000          | 1.3—            | 2,400            | 44  | 50              | 2               | 2         | 2                | +                    | +             | few               |
| May 6, 1920.....   | 55% |                  | 1,904,000          | 1.4+            | 2,400            | ..  | ..              | ..              | ..        | ..               | +                    | +             | 0                 |
| May 13, 1920.....  | 55% |                  | 1,936,000          | 1.4+            | ....             | ..  | ..              | ..              | ..        | ..               | +                    | +             | 0                 |
| June 16, 1920..... | 65% |                  | 3,032,000          | 1. +            | 4,000            | 60  | 36              | 2               | 0         | 2                | +                    | +             | 0                 |
| Mar. 17, 1921..... | 60% |                  | 2,428,000          | 1.2+            | 6,400            | 60  | 37              | 3               | 0         | 0                | +                    | +             | few               |

Clinical course: Under the administration of iron and arsenic there was a gradual increase in the hemoglobin and in the number of erythrocytes. Patient left the hospital on May 20, 1920, feeling much better and gaining in weight. One month later he began to have trouble in walking. Physical findings at the second examination in June 1920 were as follows: The color of the skin and mucous membranes had improved since leaving the hospital and there was a gain of 15 pounds in weight. The patellar and tendo

Achilles reflexes were increased. Planter reflexes were apparently normal. There were no definite sensory changes noted. Unfortunately the tuning fork test for vibration sense was not carried out. Co-ordination of upper and lower extremities was noticeably impaired.

The patient returned on March 17, 1921, for the relief of anal fissures. The physical findings were practically the same as on the previous examination with the following exceptions: Tactile pain and ther-



mal sensations were markedly diminished over palmar surfaces and stereognostic sense was lost. Protopathic and epicritic sensations were not impaired over lower extremities but vibration sense as well as joint sense was absent. No pallesthesia elicited over upper extremities. The ataxia was more pronounced than on the previous examination.

In the first two cases (Miss J. K. and J. A.), it is of interest to note that the nervous symptoms appeared early and dominated the clinical picture and that pernicious anemia was not recognized in the first patient until two months before death, and in Case II not until three years had elapsed after the paresthesias were first noted.

It is conceded that the early recognition of these cases has but very little influence in prolonging the patient's life and while symptoms attributable to spinal cord involvement give us practically no prognostic assistance, it is nevertheless very important that these cases be diagnosed early and the patient informed of the true condition that exists.

Formerly it was supposed that symptoms traceable to cord changes were due to the severity of the anemia. It has since been observed that cord lesions in pernicious anemia do not always occur in the patients showing the greatest blood destruction, in fact the cord manifestations are quite independent of remissions and relapses. This is well shown in Cases II and III (J. A. and H. O.). These two patients developed striking subjective and objective nervous symptoms over a period of two months and during this time there was a gradual improvement in the blood picture. (See Tables).

There is usually very little difficulty in making the diagnosis in the combined scleroses due to this disease when once pernicious anemia is considered. However, the early cases in which very little blood destruction has taken place and in the moderately advanced cases at the height of a remission may at first prove quite puzzling.

Now it does not follow that a blood film examination is all that is necessary to diagnose pernicious anemia, on the contrary these patients require a thorough study which should consist of the following:

1. A detailed history.
2. A complete physical examination which includes pelvic examination in female and rectal examination in males.

3. A complete blood examination which includes the study of a blood smear, blood-platelet count and a Wassermann.

4. A thorough neurological examination.

5. Determination of bile pigments in the duodenal contents.

6. Fractional gastric test meal.

7. Examination of the urine and feces.

In the neurological examination particular attention should be paid to carrying out the sensory tests, especially for vibration and joint senses. Woltman in his series of 121 cases reports that epicritic and protopathic sensibilities, i. e., tactile pain and thermal sensations were diminished in 42.2 per cent and joint and vibration sense impaired in 92 per cent.

Approximately one-third of the cases of combined sclerosis are due to pernicious anemia, so it is well to remember in the differential diagnosis that subacute degenerations of the cord may also be due to lues, arteriosclerosis, tuberculosis, diabetes, nephritis, leukemia, severe secondary anemias, carcinosis and poisoning from arsenic, lead or phosphorous.

The treatment in these cases consists of carrying out the usual general measures followed in pernicious anemia, with carefully regulated massages and hot baths indicated for the relief of the annoying nervous symptoms.

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# RECENT PROGRESS IN THE DIAGNOSIS AND TREATMENT OF CONGENITAL SYPHILIS IN INFANTS AND CHILDREN\*

WALTER R. RAMSEY, M. D.  
*St. Paul, Minn.*

Syphilis offers a greater menace to the citizenry of this country today than any other disease. Syphilis among all classes is much more common than is generally supposed. More than two thirds of all those who have the disease, either acquired or inherited, have it from no fault of their own.

Jeans, of the Washington Medical School, St. Louis, who has made a careful study from personal observation as well as a very complete resume of the literature, estimates that in the poorer classes from 10 to 20 percent of all adult males and 10 per cent of married women are syphilitic. He also concludes that from 5 to 6 per cent of the living infants of the poorer classes in this country have syphilis. From a compilation of the reports of numerous authors Jeans draws the following conclusions:

(1.) In syphilitic families 30 per cent of all pregnancies terminate in the death of the child before term.

(2.) Probably 25 to 30 per cent of clinically syphilitic infants die as the result of syphilis.

(3.) Only about 17 per cent of all pregnancies in syphilitic families result in living non-syphilitic children, who survive the period of infancy.

What of the syphilitic children who survive?

Higgins found 42 per cent of 50 mentally defective children to have positive Wassermann reactions. Gordon found 50 per cent of seventy-five cases, Fraser found 45 per cent of ninety-nine cases, Watson found 60 per cent of 204 cases. Jeans\* found 48 per cent of twenty-five cases. Green† in a study of one hundred syphilitic children found fifty-two to have pathologic eye ground lesions.

Physical defects of all kind are extremely

common but time will not permit even a brief mention of these at this time.

What can be done to prevent women giving birth to syphilitic children? I answer: everything.

It lies within the power of the State in co-operation with the medical profession and the public by practical measures to entirely prevent inherited syphilis. How?

If Wassermann reactions were demanded of every man and woman before marriage, and a license refused to all who react persistently positive; and if Wassermann reactions were made by physicians as a routine on all pregnant women, just as an examination is made, and anti-syphilitic treatment given during the period of pregnancy to all those who react positive, congenital syphilis would soon be extremely rare. Treatment for parents and infants should be maintained until they persistently react negatively.

What are the difficulties which present themselves as things are today for the average physician?

Physical signs being frequently absent in the syphilitic mother, the diagnosis except by means of the Wassermann, or one of its modifications, is frequently difficult.

The history of one or more miscarriages should be sufficient to warrant a Wassermann being taken from both parents. A positive diagnosis of syphilis should not be made from one Wassermann. After several miscarriages it not infrequently happens that a baby is born that is apparently normal at birth especially if the mother were infected a considerable time previously. Infants born of syphilitic parents may or may not show the typical evidences of syphilis at birth. If they do not show these signs at birth, they are almost sure to show some of them within the first six weeks. These signs are: first, snuffles with a thin rather colorless discharge from the nose, and some excoriation of the skin at the junction with the mucous membrane at the margin of the nares; second, irregular blotches in the skin appearing usually on the soles of the feet and palms of the hands and sometimes over the entire body; third, the rhagaden, a peculiar pleating around

\*Jean's review Am. Jour. Dis. Ch. July, 1920.

†Green's review Am. Jour. Dis. Ch., July, 1920.

\*Presented before the Southern Minnesota Medical Association, Mankato, Minn., November, 1920.



mouth and anus; fourth, a typical senile appearance of the face.

The Wassermann may be negative during the first week in a syphilitic infant; any or all of the above signs are sufficient to indicate a Wassermann of the parents. In older children the Hutchinson teeth are suggestive but not wholly pathognomonic.

Keratitis should always suggest syphilis and should be followed by a Wassermann. Involvement of the central nervous system such as hydrocephalus should not only have a Wassermann but a lumbar puncture, the fluid being subjected to the colloidal gold test and the Wassermann.

All these tests are made now free of charge at the State Board of Health Laboratory, receptacles and cartons for transport through the mails being furnished. Reports are prompt and dependable.

*Treatment:*—The drugs chiefly employed in the treatment of syphilis are: mercury (or one of its salts) and arsphenamin or one of its allied products. Arsphenamin or salvarsan and neo-arsphenamin or neo-salvarsan are the two arsenical preparations in use. It is generally conceded that although salvarsan is much more active therapeutically than neo-salvarsan, that salvarsan is two or three times more toxic than neo-salvarsan.

In the treatment of congenital syphilis in infants, the arsenical preparation must be used with great caution. Villarago recommends in infants the subcutaneous injection of one centigram per kilogram in 5 c.c. of serum every 15 days for 3 doses. Lesage calls attention to the necessity of beginning with small doses in infancy and says we should begin with milligrams rather than centigrams. It was demonstrated some years ago that where the mother was having salvarsan the infant received considerable of the drug through the milk supply and showed marked improvement of the symptoms.

It is in mercury and its salts to which we still cling in the long continued treatment of congenital syphilis in infants and children. The treatment of syphilis with mercury is still a haphazard affair, the quantity and frequency of the dose being determined by keeping within the tolerance to the extent that the child

does not suffer from salivation or a too severe diarrhea.

Until 1918\* there were no tests delicate enough by which the quantitative estimate of the mercury either in the blood or urine could be measured. As late as 1917 there was still doubt in the minds of investigators whether mercury was directly absorbed into the circulation or whether it gained entrance to the blood stream *only by being volatilized and inhaled*.

Wile and Elliott, by employing a modification of the Reinsch method, were able to detect small amounts of mercury in the urine and by this method demonstrate that the absorption of mercury was both by inunction through the skin and by volatilization.

In 1918 Ramsey and Ziegler made some experiments, the report of which was published in the American Journal of the Diseases of Children, November, 1918.

From this series of experiments the following conclusions were drawn:

(1.) In infants and children, mercury, when given by the mouth, by inunction or intramuscularly, is excreted at least partially by the urine.

(2.) In new-born infants and older children mercurial ointment when placed in contact with the skin, without any friction being used (protected and sealed by wax paper from being volatilized and inhaled), is taken up by the skin and excreted in the urine and continues to be excreted in the urine for a variable time after all treatment has been discontinued.

(3.) By inunction (with rubbing) mercury is readily taken up by the skin and eliminated in the urine and continues to be eliminated for a considerable time.

(4.) When one inunction is given, the maximum daily amount of mercury is usually eliminated during the following twenty-four hours, smaller amounts being eliminated for a variable time.

In a new series of experiments we have sought to determine with some degree of accuracy the amount and rapidity of absorption of the mercurial preparations in use as de-

\*The quantitative analysis referred to in this paper will be found in an article by Ramsey and Graebner. (Journal of Diseases of Children, September, 1920.)

terminated by quantitative estimate of the amounts eliminated in the urine. The method was the same as that employed in the previous experiments.

It was observed that when 50 per cent ointment was used, the elimination began soon after administration, the maximum elimination occurring during the following three days, the elimination being fairly complete within five days. When double the amount, 2 gm. of the 50 per cent ointment, was used as inunction, the amounts eliminated were relatively larger.

With the 33 1/3 per cent mercurial ointment, even when double the quantity was used, the elimination did not begin in appreciable amounts until the second day after inunction, and then in much less quantities than when the 50 per cent ointment was given. When the mercurial ointment was simply used by smearing on the skin, without rubbing, the amount eliminated was much less than when used as an inunction.

In the case of calomel ointment, it was found that the elimination was delayed, and the total quantity eliminated was much less than with the mercurial ointment, although two grams were used for each inunction.

With the mercurial salicylate in oil, used hypodermically, it was found that the maximum elimination is in the first twenty-four hours, smaller quantities continuing to be eliminated for six or seven days.

The mercuric chloride solutions used hypodermically continued to be eliminated in amounts not sufficient to be measured for six or seven days. In one case there was an appreciable amount of protein in the urine following its use, a point which we also observed in our previous experiments.

Calomel given by mouth (1 grain) either in one dose or divided doses, was eliminated in appreciable amounts although not sufficient to be measured for six or seven days.

Gray powder, although given in large doses, was eliminated to a very small extent and for a short period of time.

The practical deductions which may be drawn from this series of experiments are, therefore, as follows:

1. Mercurial ointment, 50 per cent, is to be

preferred to the less concentrated forms and need not be repeated more often than twice weekly instead of daily. The quantity of mercury absorbed is much increased by friction.

2. Calomel ointment is absorbed, but less rapidly and to a less extent than the mercurial ointment and should, therefore, be given in greater concentration.

3. The salicylate of mercury in oil should be given hypodermically twice weekly instead of once.

4. The mercuric chloride, by hypodermic injections, although the dose is very small, continues to be eliminated for six or seven days. The fact, however, that its use frequently is followed by the appearance of protein in the urine should exclude it from the treatment of syphilis in children.

5. Calomel by the mouth is readily absorbed, and continues to be eliminated for a considerable time so that it is probable that it would be sufficient to give it at intervals of several days, thus avoiding diarrhea.

6. Gray powder is absorbed to a small degree and eliminated rather rapidly so that large doses repeated daily would probably be necessary to maintain mercury in the circulation.

We shall continue our experiments and determine, if possible, whether the clinical results will bear out the observations made in these experiments. In one case (M. S.) of congenital syphilis, with marked keratitis, treated by inunctions of 50 per cent mercurial ointment, once weekly, the clinical progress was apparently quite as satisfactory as in cases where daily inunctions were given.

#### DISCUSSION

DR. ROY N. ANDREWS, Mankato: I would like to add a few words to Dr. Ramsey's excellent paper in regard to the diagnosis of syphilis immediately after birth. It is important to the physician, as well as to the patient, to diagnose syphilis early in both the mother and in the child. The diagnosis in the mother is a little more difficult, but by obtaining a careful history, particularly of the pregnancies and miscarriages, your suspicions can, at least, be aroused. Fortunately, we have the Wassermann test at our disposal and this should be taken routinely. One may find by careful examination some evidences of syphilis in the mother, but more often the blood test is the only way a diag-



nosis can be made. One should not be satisfied with this alone, but should examine the spinal fluid as well in cases where doubt may arise.

The diagnosis in the infant is not so difficult. Babies with a congenital syphilis are undersized and of a feeble vitality. Syphilitic infants have a tendency to show moderate irregular elevations of temperature. Sooner or later, they develop a more or less marked degree of secondary anemia. Furthermore, these infants have a tendency to gastric, intestinal and nutritional disturbances and to infections of the respiratory tract.

Characteristic signs of congenital syphilis develop soon after birth. If an infant reaches three months without any signs, the probability is that it is not syphilitic. There are three important signs of syphilis, which may be present at birth. First, snuffles; second, vesicular eruption on the hands and feet; and third, enlargement of the spleen. These signs are not present in every case and indeed are absent in the majority of cases. They deserve special attention because they are the only important clinical signs which can be seen in the new born. If present, it may mean that the infection took place early in fetal life. The so-called snuffles represent a cellular infiltration of the nasal mucous membrane, causing the passage to be narrowed or stopped up, thus resulting in a persistent snuffling sound.

The eruption of vesicles upon the hands and feet is the so-called syphilitic pemphigus or pemphigus neonatorum. The appearance is that of round vesicles which vary in size from a small pea to a cherry upon an inflamed base. They are at first serous, but later become cloudy and purulent.

The localization of the lesions upon the palms of the hands and soles of the feet (on the plantar surface of the fingers and toes) is wholly characteristic. When present, it usually appears at birth. It is always an early sign and very seldom appears later than the third or fourth week. Enlargement of the spleen when seen in the new born is an almost pathognomonic sign of syphilis, and indeed is the only sign of visceral syphilis which can be detected. Even when not present at birth, it is almost certain to appear at some later period, if only for a short time, so that it may be said to be an almost constant sign of the disease. It may not be present at the time of examination, but found at some other time, so that its absence does not mean a negative diagnosis.

The effects of syphilis osteochondritis may sometimes be visible at birth. It is manifested as a pseudo-paralysis which is difficult to distinguish from obstetrical paralysis. Iritis is an occasional manifestation of syphilis in the new born, and when present, is practically pathognomonic. Syphilitic disease of the nervous system, of the organs of special sense (except iritis) and cutaneous manifestations which are so markedly constant and

characteristic in the later stage of the disease are never seen in the newborn.

New born syphilitic infants, even at full term, are usually under weight, below size and their vitality is below par. Premature births are not uncommon.

We must remember that fontanelle and lumbar punctures make serological diagnosis as easily available in the case of the child as in the adult. We should like to see the day when blood from the umbilical cord is routinely subjected to a Wassermann test.

DR. LIDA OSBORN, Mankato: The importance of this subject is shown by the frequency of occurrence of this condition. As congenital syphilis is of such frequent occurrence, it means a very large percentage in the death rate among the unborn and newborn children. Seventeen per cent of the pregnancies in syphilitic families result in living children. Of the living children in syphilitic families, 75 per cent are syphilitic. Even though the early signs of syphilis may disappear without treatment, usually, a few years later, the signs will reappear, and these children will give all the evidences of the disease without further tests. Of course, in many cases we depend very largely upon the Wassermann test, which is usually positive. However, there are other tests, which have been tried out. As to the luetin test, its only value has proved to be in some of the late obscure cases where the Wassermann is negative. If you have a positive test you can depend upon it, but if it is negative it means nothing. A number of coagulation tests have been tried, but at the present time these have not been found practical. There is one test that has been worked out which is supposed to be very dependable, and that is the Sachs-Georgi. This test is simpler in performance, but the objection to it is that it needs from thirty-six to forty-eight hours to get the results.

In the treatment of syphilis we have to depend very largely upon mercury by inunction, and Dr. Ramsey has done a great deal to help us put the treatment upon the basis upon which we can depend. Objection to that treatment has been the inaccuracy of the dose because we do not know the amount of absorption, and it may be uncertain. Some authorities at the present time are using neo-salvarsan by injection into the frontal sinus in some instances, but there is great danger attached to this method, and it has not proven practical in the hands of the average practitioner. The work Dr. Ramsey has done in the last year or so will help up to feel that we should get results and we ought to know more about the quantity of drugs absorbed and the results we may expect from its use.

DR. HENRY L. ULRICH, Minneapolis: While I have listened with great interest to the paper of Dr. Ramsey, and while he has spoken about the rate of absorption of drugs and the elimination of mercury, he has not told us about the value of these

various drugs in connection with the clinical results of his treatment, and I would like to ask him to touch on that in his closing remarks.

DR. RAMSEY, St. Paul (closing the discussion): I am very glad to have these points brought out because I simply could not cover them in the short time at my disposal, and it was my hope that they would be brought out in the discussion.

One point I wanted to make particularly was that congenital syphilis is very easy to diagnose in very typical cases, but a large number of cases are not typical and show nothing in the way of any sign, except one like snuffles, or vesicles on the palms of the hands. Many times they have blotches which can only be seen by making pressure, or a pleated condition around the mouth or anus or both. These should warrant a Wassermann test being taken.

With reference to the Wassermann tests, we find a great deal of difficulty in the mind of the average practitioner about the question of taking Wassermann. It is a simple thing. We take them every day in our office. All you need to do is to prick the finger and obtain two c. c. of blood, which is easily gotten, the laboratory of the State Board of Health furnishes containers and give very prompt reports, very often the very next day, so that there is no excuse for not making Wassermanns.

I want to point out again that in very young individuals a Wassermann sometimes is not positive for the first week, so that if there are any symptoms at all manifested by the child that are suspicious, you ought to take Wassermanns from the parents themselves. The fact of one of two miscarriages in the mother, although she shows nothing, should warrant you in making a Wassermann.

As to the trouble that is anticipated with the family, I find it is largely a question of education, and our State Board of Health and laboratories in the country are doing a great deal to dissipate that. When these Wassermanns show positive, they send literature to the people telling them that it is a contagious disease and what it means to them in the future. We find the whole family, father, mother and children, want Wassermanns taken.

In reference to the value of the different drugs concerning which Dr. Ulrich asked, I may say that we have not gone sufficiently far. We started out to demonstrate one thing, and we have demonstrated something we think very definite, but I can simply say this as far as we have gone with the small number of cases, giving mercury ointment in these cases, not to exceed twice a week, we have had remarkable results, seemingly as good, if not better than we have ever had before.





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## EDITORIAL

### THE ANNUAL STATE MEDICAL MEETING

The meeting of the association in Duluth was on the whole a great success, as all who attended will agree. The local members of the profession lived up to their reputation as entertainers and made every one feel at home. The two themes of the convention, emphasized by both the retiring president, Dr. C. E. Riggs, and the newly elected president, Dr. J. Frank Corbett, were, first, the necessity of a change in the attitude of the Association regarding the so-called cults in the practice of the healing art and the undesirability of socialized medicine.

Our distinguished visitor, Dr. Joseph C. Bloodgood, of Baltimore, assured us we had little to fear along these lines if we, as regular practitioners, showed results. He laid emphasis on the responsibility of the profession for the education of the public in medical matters and forcibly made his point felt by the statement that every appendix requiring drainage was the fault of the profession through its failure in its education medically of that particular locality in which the patient lived. Dr. Bloodgood's ideas of the value of the physician and surgeon from a therapeutic standpoint appeared to some of his hearers as very pessimistic, and was probably due, in part, to his large experience with the cancer problem. He was not far from right, however, and he did well to call attention to the greater importance of preventive medicine as compared with therapeutics.

The attendance at the meeting was regrettably small, the register showing 306. While the number

attending the annual meeting when it is held outside of the Twin Cities is usually smaller, August seems to be a rather inconvenient time for many members as it interferes with summer vacations.

The program as a whole proved interesting. The large majority of papers were read by men from the cities and this will probably ever be the case. It is the specialist who as a rule is in position to present valuable work in his particular sphere, and he is located in the city. The general practitioners from the rural district, however, often have valuable information to impart to their city brethren, and it is to be hoped that they will be better represented at future meetings.

The following officers were elected for the year 1922:

J. Frank Corbett, M. D., Minneapolis.....President  
S. H. Boyer, M. D., Duluth.....1st Vice President  
A. W. Ide, M. D., Brainerd.....2nd Vice President  
John Williams, M. D., Lake Crystal.....

.....3rd Vice President  
Carl B. Drake, M. D., St. Paul.....Secretary  
F. L. Beckley, M. D., St. Paul.....Treasurer

Dr. C. E. Dampier, Dr. R. J. Hill and Dr. F. A. Dodge were re-elected councilors from their respective districts.

Minneapolis was chosen for the next annual meeting which will be held the second week in October, 1922.

### OUTLYING HOSPITALS AS CENTERS FOR CONTINUATION COURSES FOR PRACTITIONERS

The very thoughtful article in this number by Dr. John M. Dodson, should stimulate outlying hospitals in the state of Minnesota to consider the adaptation of their facilities and personnel to the provision of opportunities for study by general practitioners who wish to brush up in laboratory work, diagnosis, and emergency surgery. Dr. Dodson has outlined very clearly in considerable detail the sort of work in each of these three departments, which he thinks the honest, progressive, general practitioner who wishes to remain in general practice would find it worth while to do in brief periods of intensive study. The work as outlined, for the most part, is just such work as might readily be supplied by any good hospital with an organized staff and proper laboratory and clinical facilities. The work should be stimulating to the staff as well as to the student practitioner. Teaching, like mercy, "blesseth him that gives, as well as him that takes."

As Dr. Dodson has pointed out, it is not alone

in those hospitals connected with medical schools in which such instructions might be efficiently given. Besides the unused teaching material which, no doubt, may still be found in the Twin Cities, there can be no question but that in both charity and pay-patient hospitals in other cities of Minnesota, as for example, in Duluth and Mankato, there also exists unused clinical and laboratory material which might be utilized most profitably for study by general practitioners of the state who are able to give only short periods to review work.

The success of the short courses given at the University Medical School this summer, the large attendance, and the general satisfaction expressed by the graduate men, all attest the growing demand for this sort of work in the northwest. It needs only a bit of clear headed organization to make more potential facilities available for the large number of men who would gladly use them.

L. B. W.

### UNIVERSITY SHORT COURSES

The May short course at the University Medical School is a recognition of the existence of the general practitioner and his needs.

In his endeavor to keep up with medical progress the general practitioner buys books, subscribes to magazines, attends society meetings, and takes in clinics and city "weeks" but still finds himself rather overwhelmed by the constantly increasing supply of new pabulum, the nutritional value of which he is often unable to assess.

The medical man, however, many years out of college, will not consider fundamental courses. Even the would-be specialist scarcely takes the time to study afresh the substructure of his restricted field. Courses to meet with the approval of the general practitioner must be strictly "practical." His grounding in medicine must be taken for granted.

The May short course at the State Medical School of four weeks was an attempt to meet this need. Some 32 men ventured in from three or four states, men whose years of graduation dated from 1893 to 1908. A numerous corps of instructors and specialists kept the men busy from 8 A. M. to 5 P. M. and later. A detailed program for each day in Medicine, Pediatrics,

Surgery, and Obstetrics and Gynecology enabled the men to fill the day as they wished, for, while a man signed, as a rule, for a particular course it was not necessary for him to confine himself to one subject. Before the men left each was asked to make suggestions looking to an improvement in future courses.

It is to be hoped that the University will duplicate this Short Course next May and that the general practitioners of the tributary territory will respond to this endeavor in larger numbers so that the interest of the instructors may be kept up to a practical pitch.

H. B. A.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### STATE MEDICAL SOCIETY OF WISCONSIN

The State Medical Society of Wisconsin celebrated its seventy-fifth birthday by holding a "Home-Coming" meeting in Milwaukee, September 7, 8 and 9, 1921. All former Wisconsin men, whether they have practiced there or left Wisconsin to study medicine, practicing elsewhere after graduating, were invited to this home-coming.

The officers of the society are anxious to secure at this time for mailing purposes the names of all former Wisconsin men. They will confer a favor by sending their names and addresses to Dr. Rock Sleyster, Secretary, Wauwatosa, Wisconsin.

## NEWS OF THE HOSPITALS

Dr. Theodore Bratrud, of Warren, who is to be chief surgeon at the new Memorial Hospital at Hallock, visited that city recently to consult with Drs. Shaleen & Overend and at the same time look over the new hospital.

Miss Schroeder, superintendent of nurses at St. John's Hospital, St. Paul, has returned from her vacation.

Drs. Plondke and Birnberg, members of the staff at St. John's Hospital, have returned from Duluth, where they read papers before the Minnesota State Medical Association.





## OF GENERAL INTEREST

A baby girl was born August 14th to Dr. and Mrs. J. R. Sturre, of Watkins, Minnesota.

Dr. O. E. Bratrud, of Warren, is in Chicago where he is taking a few weeks postgraduate course.

Dr. J. A. Roy, of Stephen, Minnesota, has sold his practice to Dr. W. P. Baldwin, of Fargo, N. D.

Dr. P. M. Fischer, of Shakopee, is recuperating from a recent operation for acute appendicitis.

Dr. R. J. Hodapp, of Madelia, has become associated with the Willmar Clinic at Willmar, Minnesota.

Dr. A. E. Barclay, well known roentgenologist of Manchester, England, recently visited the Mayo Clinic.

Dr. O. S. Werner, of Lindstrom, has located in South Haven, Minn., where he has purchased a small hospital.

Dr. F. U. Davis, of Faribault, has been appointed local surgeon or the Minneapolis, Northfield and Southern railroad.

Dr. C. P. Robbins, of Winona, has returned from Philadelphia where he has been taking a six weeks special course in medicine.

Dr. Baldwin, of Casselton, N. D., has recently located at Stephen, Minn., succeeding Dr. J. A. Roy who has removed to Argyle.

Dr. James Hayes, recently a Fellow in Surgery in the Mayo Foundation, has opened offices in the La Salle Building in Minneapolis.

Dr. Harry Rowe, of St. James, is in New York City where he is taking a postgraduate course at the Herman Knapp Memorial Eye Hospital.

Dr. M. C. Bergheim, formerly of Raymond, has recently located at Hawley, where he will continue in the practice of medicine and surgery.

Dr. W. J. Mayo spent the early part of July visiting institutions throughout the state which are under the direction of the University of Minnesota.

Dr. DeWitt Garlock, of Los Angeles, has joined his brother, Dr. A. V. Garlock, of Bemidji. The firm will specialize in diseases of the eye, ear, throat and nose.

Dr. E. W. Buckley, of St. Paul, was elected Supreme Physician by the Knights of Columbus at the annual international convention held in San Francisco in August.

Dr. F. J. Brabec, of Perham, has taken Dr. H. M. Juergens, of Missoula, Montana, into partnership. Dr. Juergens is a graduate of the University of Minnesota Medical School.

Dr. F. W. Calhoun, of Albert Lea, has recently returned from Europe where he has been the past two months visiting the battlefields and cities of France and England.

Dr. L. B. Derdiger, of Battle Lake, attended the A. M. A. meeting in Boston this summer, after which he visited various places of interest in New England before returning to his home.

Dr. J. S. Collins, of Caledonia, has moved to Wabasha, where he has opened offices. Dr. Collins has spent considerable time in postgraduate work in various schools the past year or so.

The firm of Drs. Verne and Thornby, of Moorhead, has been recently dissolved, Dr. Verne having gone to California where he will make his future home. Dr. Thornby will continue in practice at Moorhead.

Dr. H. Longstreet Taylor, of St. Paul, is abroad for the summer months. He attended the International Congress of Tuberculosis in London the latter part of July, and will return this fall after touring the continent.

Dr. S. A. Slater, superintendent of the Southwestern Minnesota Sanatorium of Worthington, was chosen as state president of the Minnesota Tuberculosis Association at a meeting held recently at Sauk Center.

Dr. Everett K. Geer, of St. Paul, has returned from Saranac Lake, New York, where he studied at the Trudeau School of Tuberculosis. Dr. Geer has recently received an appointment as Instructor in Medicine from the University of Minnesota Medical School.

Dr. Mann and Dr. Magath, of the Mayo Foundation, have returned from Fairport, Iowa, where they spent three weeks as guests of the United States Bureau of Fisheries doing experimental work on the function of the liver with a view to determining whether or not fishes can be used for experimental purposes.

Dr. E. E. Hall, of Little Falls, received considerable notoriety in the newspaper world because of a warrant issued by the Federal officials against him charging violation of the Volstead prohibition act. We take pleasure in giving publicity to the fact that after considerable delay in starting proceedings a speedy dismissal of the charges was reached.

Dr. E. C. Yao, of Shanghai, and Dr. K. H. Li, of Soochow, who are on their way home after spending seven years in this country in the study of medicine and surgery, passed through St. Paul recently, arriving here from Rochester where they spent several days attending clinics at the Mayo hospital. They were very much interested in this country from a general standpoint, and speak exceptionally good English. Dr. Li is a graduate of Tsinghua College of Medicine in Peking, and came here seven years ago to attend the University of Pennsylvania, being especially interested in diseases of children. He will return to his native Soochow and devote his time to child welfare work from a medical standpoint. Dr. Yao, who is a native of Shanghai, also attended the University of Pennsylvania, and returns to his country to specialize in surgical work. They sailed Au-

gust 18th on the Empress of Asia, which also carried John D. Rockefeller, Jr., Dr. William Mayo, and several other prominent medical and scientific men who will attend the dedication of the Peking Union Medical College under the auspices of the China Medical conference which will be held at Peking about the middle of September.

As the result of a conference of representatives of the Public Health Service, the Red Cross and the Legion, a widespread publicity campaign is being undertaken by these agencies in an effort to get in touch with discharged soldiers who have not received proper compensation for disability incurred in war service. Strange to say, in spite of the publicity already given the activities of the government in caring for disabled soldiers it is felt in various quarters that some have been neglected. The headquarters of these activities for the portion of the Northwest in which Minnesota lies, are located in Minneapolis at the Plaza Hotel, and applicants should communicate with the War Risk Bureau or Bureau of Vocational Training at this address.

One of the laboratories in St. Paul has made a departure from their ordinary line of activities and will give a three months course to young women with certain preliminary qualifications in general laboratory work. The course begins October first and will consist of practical laboratory work, lectures, recitations, demonstrations and collateral reading. Lectures and classroom work will cover general bacteriology, rudiments of chemistry and physiology, interpretation of laboratory reports, the care and handling of patients, the preparation of patients for physical examination, the preparation of case histories, maintenance of office records, secretarial work and the handling of commercial accounts. This course is intended primarily to train office assistants for the medical profession.

The Minnesota State Board of Health reports: "Since the middle of April, centered about Sebeka, Wadena Co., and extending into surrounding counties, there has occurred an unusual outbreak of disease in which early cases were so mild that medical attendance was not sought. The attention of the State Board of Health was first called to this outbreak about June 10 by physicians of Menahga and Sebeka. Most cases first studied presented more or less marked meningeal symptoms; many cases recovered without apparent muscular impairment after a brief illness of 4 or 5 days. Children make up most of the cases, but few adults being attacked. Multiple cases occurred in a large number of families and contact was traced in a large percentage of cases. More than 100 cases have been studied by representatives of the State Board of Health (300 cases estimated) and but 10 deaths have occurred. A careful clinical study of cases combined with laboratory examinations of more than 40 spinal fluids, together with autopsy studies in one case, leads to the opinion that this is an outbreak of polio-enceph-

alo-myelitis, i. e., the disease is essentially epidemic anterior poliomyelitis with the encephalitic type predominating."

## BOOK REVIEWS

**SOME AIDS IN THE RECORD KEEPING OF ANO-RECTAL CASES:** Ralph W. Jackson (Minutes Amer. Proct. Soc., April, 1920). The writer emphasized the influence of the American Proctologic Society in raising the study and treatment of diseases of the rectum and anus from the domain of quackery to that of a dignified and recognized specialty, and its further influence in securing national recognition in the establishment of the section on Gastro-Enterology and Proctology in the A. M. A. He said that this accomplishment should be no indication for abatement, but rather for increase in the activity of the society. The writer further said that the proctologist may legitimately confine his work to the anus, rectum and sigmoid, or may include more proximal portions of the alimentary canal. For the standardization of the records of the distal proctologist, he presented a set of five diagrammatic rubber stamps, which he uses, and explained them to the fellows by means of corresponding diagrams in blackboard form. No. 1 consists of two concentric segmented circles representing the external and internal hemorrhoidal zones. No. 2 shows the anus and buttocks in the lithotomy position. No. 3 shows the anus and rectum and adjacent structures in transverse vertical section. Nos. 4 and 5 show the same in antero-posterior vertical section in either sex. All these are purely diagrammatic, and, by a system of marks, the writer showed how practically all ano-rectal pathology could be recorded with very little effort. These diagrams are also most useful in reports to physicians of referred cases.

**GEORGE M. STERNBERG.** A Biography. Martha L. Sternberg, American Medical Association, 1920. The life and work of General Sternberg should serve to stimulate the present and future generations of the medical profession in the field of preventive medicine.

The book furnishes a record of his military and scientific career and while being of special interest to medical officers of the army it can be read with profit by all civilian physicians.

—EVERETT K. GEER.

**Coagulin-Cuba Omitted from New and Nonofficial Remedies:**—Coagulin-Ciba was admitted to New and Nonofficial Remedies in 1915. It is stated to be an extract prepared from blood platelets and to contain thromboplastic substances mixed with lactose. Extensive clinical reports appeared to justify its acceptance for New and Nonofficial Remedies. However, in 1918, Dr. Arthur D. Hirschfelder reported to



the Council that a number of specimens of Coagulin-Ciba failed to accelerate the coagulation time of blood. The results of Dr. Hirschfelder were subsequently confirmed by Dr. P. J. Hanzlik, who made an extensive investigation of the effects of Coagulin-Ciba at the invitation of the Council's Therapeutic Research Committee. Since the evidence indicates that Coagulin-Ciba has little efficacy, if any, as a hemostatic, the Council directed its omission from New and Nonofficial Remedies. (Abstracted from Reports Council on Pharmacy and Chemistry. 1920, p. 53.)

## EPIDEMIC RESPIRATORY DISEASE

**THE PNEUMONIAS AND OTHER INFECTIONS OF THE RESPIRATORY TRACT ACCOMPANYING INFLUENZA AND MEASLES.** By Eugene L. Opie, M. D., Francis G. Blake, M. D., James C. Small, M. D., Thomas M. Rivers, M. D.

This book is an expression of the work done by a group of medical officers assigned in July, 1918 by the Surgeon General to study the pneumonias prevalent in the army.

The commission began its work at Camp Funston. At the end of August, 1918, it was transferred to Camp Pike, which, during the encampment, ranked third in death rate from lobar pneumonia and fourth in death rate from broncho-pneumonia among 32 camps established in this country.

The contents consists of seven chapters and an appendix. In consecutive order they deal with the etiology of influenza, clinical features and bacteriology of influenza and its associated purulent bronchitis and pneumonia, secondary infection in the ward treatment of influenza and pneumonia, the pathology and bacteriology of pneumonia following influenza, secondary infection in the ward treatment of measles, the pathology and bacteriology following measles. A summary of the investigation and the conclusions reached are incorporated in the seventh chapter. The appendix gives an outline of the experimental inoculation of monkeys with bacillus influenza and micro-organisms isolated from the pneumonias of influenza.

In the various fields of experiment and observation each chapter is a logical treatise describing in their order the employed methods, the recorded observations, the post-mortem findings and finally the discussion and summary of conclusions. Numerous clinical case reports together with autopsy findings make the work most valuable. A well collated bibliography, numerous charts, 33 figures, 77 elaborate tables are enviable factors of correlation especially in the most comprehensive study ever undertaken of the epidemic respiratory disease. The keystone of this investigation forms the chapter on the pathology and bacteriology of pneumonia following influenza. To attempt to write satisfactorily in a brief review the contents of a work which already has been reduced to essentials is to try the impossible. And,

therefore, anyone interested not in the epidemic respiratory disease only, but in any inflammatory pulmonary condition will profit immensely by reading the original.

J. A. LEPAK.

## PHYSIOLOGY AND BIOCHEMISTRY IN MODERN MEDICINE. By J. J. R. Macleod, M. B.

Since the third edition appears only two years after the first, this work undoubtedly must be in great demand. Physiology and biochemistry are forcing themselves more and more prominently in all advances of modern medicine. Medical men, as never before, think more seriously in terms of functions. The keynote in this work is emphasis on the application of physiology and biochemistry to the practice of medicine.

In the third edition the section on the nervous system has been rewritten. The section dealing with the chemistry of respiration has been enlarged and revised by the additions of the clinical application. Additional chapters appear here and there dealing with the practical problems, such as, the measurement of the functional capacity of the heart, the principles of ventilation and therapeutic value of oxygen, vitamins, the capillary circulation, surgical shock, and the interpretation of the polysphygmograms. Doubtless one of the most interesting, both from a practical and theoretical viewpoint is the section dealing with the endocrine glands. The work is indispensable in the practice of medicine.

J. A. LEPAK.

## ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1920. Cloth. Price, postpaid, \$1.00. Pp. 72. Chicago; American Medical Association, 1921.

While New and Nonofficial Remedies consists in part of descriptions of those proprietary medicines which the Council deemed worthy of consideration by the medical profession, the Annual Reports of the Council on Pharmacy and Chemistry describe the preparations which the Council finds unworthy of recognition. In addition, these annual reports contain other announcements of the Council.

The present volume contains a number of interesting reports. Thus we find a statement which makes it clear that many of the large pharmaceutical houses are definitely opposed to the work of the Council and will remain antagonistic until a very large proportion of the medical profession will give the Council their active support. The volume also contains a report on some digitalis preparations which the Council examined and declared to be pharmacopoeial digitalis products and therefore do not require the control of the Council.

Of the reports on proprietary medicines found unacceptable for New and Nonofficial Remedies there are reports on the following which, because of the publicity given the products by their exploiters, will be of special interest to physicians: Platt's Chlor-

ides, Syrup Leptinol (formerly Syrup Balsamea), Sukro-Serum Spiroside, Libradol, Supsalvs.

Of considerable interest are reports on a number of products which were admitted to New and Non-official Remedies on the basis of evidence which at the time seemed to indicate the products to have therapeutic merit, but which did not stand the test of time and which therefore have been omitted from the 1921 edition of New and Nonofficial Remedies. These reports give evidence that great care is taken to keep New and Nonofficial Remedies up to date.

Those who are not familiar with the methods of the Council in the examination of new medicaments or who may even have been inclined to look upon the

acceptance or rejection of a medicament by the Council as a somewhat perfunctory procedure, should read the report of "Chloryptus"—a chlorinated eucalyptus oil. Its proprietor believed it to be a most efficient wound antiseptic. He presented to the Council many lengthy reports of laboratory tests and of clinical trial. The Council found the evidence inconclusive and refused recognition to the product. The discoverer of Chloryptus apparently has accepted the conclusion of the Council—at all events it is not being pushed—and thus many a physician is spared the temptation of experimenting with a new drug which in the end will but add to his long list of medicaments which have been tried and found wanting.



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# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### MINNESOTA MEDICINE IN THE MAKING: PERSONAL REMINISCENCES\*

C. EUGENE RIGGS, M. D.  
*St. Paul, Minn.*

Members of the Minnesota State Medical Association,

Ladies and Gentlemen:

In deciding upon what topic I should address you today, it occurred to me that it might possibly be of interest to you to hear some recollections of Minnesota Medicine in the making. The subject is too large to treat exhaustively and too broad for any one man's experience to cover it all. So, please remember, I only aspire to give you a few personal impressions. Forty years ago the practice of medicine in Minnesota was quite different from what it is today and there are few men left in active practice whose memories cover both phases. We have traveled a long way, hoped greatly, achieved much—and the end is far off.

As you know, all young doctors are haunted by a problem and a fear—the problem of where to locate; the fear of unsucess in the chosen place. In my young days I was interne in a Baltimore hospital and in the course of wrestling with these anxieties, I wrote, among other letters of inquiry, one to Dr. A. J. Stone, asking about the advantages of St. Paul as a location. Shortly afterward he came to Baltimore. I had never seen Dr. Stone, nor he me, of course, but one morning he met me on the street several blocks from the hospital, stopped me and inquired if I were Dr. Riggs. Answering in the affirmative, I inquired how he knew me.

He replied, "It would be no insult, Sir, to ask any man if he were Dr. Riggs."

The characteristic cleverness, tact and bonhomie of this response may have had something to do with making me feel that St. Paul was an appreciative and congenial spot. At all events, after talking it over with Dr. Stone, I came to St. Paul in the spring of 1881. It was then a city of 43,000 people. Being a pioneer city, as it was, with the roads out around it mere prairie trails and good hunting to be had on its very borders, it certainly had less to boast of in respect to medical equipment and hospital facilities than older cities of its size further east. But I firmly believe it was unequalled in one thing—the *personal quality* of its medical men.

Soon after arriving, I attended my first meeting of this honorable body. It was held in Minneapolis and I have a very clear remembrance of it. The papers were interesting and well discussed and a delightful spirit of *camaraderie* prevailed, but the personnel of the men I met there impressed me more than anything else. These were fellow-workers who would spur a man to do his best. They were real men. They were strenuous, eager, active, simply saturated with the finer ideals of the profession. Medicine to them was not a business to be estimated cold-bloodedly in terms of the money it brought in, but a profession to be followed with joyous enthusiasm. They were as brothers banded together to fight disease and death in the fear of God and the love of man.

Do you think I am getting too flowery? I assure you I cannot overstate the strength of this early impression.

Among the outstanding figures in the medical life of that day were Stone, Wheaton, Flagg, Smith, Senkler, Leasure, Murphy, Owens, Hand, Atwood, Stewart of St. Paul; Dunsmoor, Abbott, Kimball, Hill, and French of Minneapolis; Millard, Merrill, Pratt and Clarke, of Stillwater;

\*Presidential address before the annual meeting of the Minnesota State Medical Association, Duluth, Aug. 25, 1921.

Rose and Wood of Faribault; the elder Mayo of Rochester; Warner, Harrington and Davis of Mankato; Staples and McGaughey of Winona; Teft of Plainview; Workman of Sleepy Eye, now of Tracy; Ritchie, Collins, Walbank and McCormick of Duluth. Some of these were pioneers whose experiences went back to territorial days.

Younger practitioners coming among these men found them unselfish and courteous. It really seemed as if they could not do enough for the younger men. Instances will speak louder than words. As one example of the general attitude, I recall Dr. Stone taking an operation for a young physician and turning over to him the entire fee—\$175—a sum much larger to the latter than ten times that amount today. One of the local men, anxious to be a surgeon, but without the qualifications, undertook a tracheotomy for diphtheria and asked Dr. Wheaton to be present. He got frightened and stopped the operation. The child would have died had not Dr. Wheaton stooped down, sucked out the membrane with his own mouth and finished the operation. These things were all in the day's work with these men.

Yet I would not have you think that these men of early days were too perfect to be human. Far from it. The salary of the Health Officer then was fifty dollars per month, and there is a well authenticated tale that one year twelve leading doctors served month about at the work, and at the year's end blew in the entire six hundred dollars in one grand convivial banquet. You could hardly spend that amount in these prohibition days.

About this time I attended my first meeting of the Ramsey County Medical Society. It was held in the office of the late Dr. A. E. Senkler, over Lambie's drug store, at the corner of Third and Wabasha streets. It was an informal, home-like affair, with ten or a dozen present, among whom I recall Stone, Boardman, Wheaton and Senkler. The latter was St. Paul's pioneer internist—a modest, kindly gentleman, but a strong, forceful personality, loved by his patients, respected and popular with his confreres—a knightly soul. From that beginning has grown the large and wonderfully efficient Ramsey County Medical Society of today.

In the fabric of medicine today, the specialist is the warp and half the woof. It was far otherwise forty years ago. That was the day of the general practitioner. When I first came to St. Paul it may be said that, aside from eye and ear work, everybody did everything. Certain men were outstanding in surgery, and these became specialists later, when conditions better favored such development. It amuses me now to remember that I then meant to specialize in surgery and gynecology. There never was a person less adapted to this line of work than myself.

Neurology was non-existent as a specialty in this state, and indeed the neurologists were but a feeble folk anywhere at that time. The researches of Golgi, Cajal and their co-workers were yet to completely revolutionize our conception of the elements of which the nervous system is constructed and their arrangement in its architecture.

In the course of my medical education I heard half a dozen lectures each upon nervous diseases and insanity, including one lecture on neurasthenia, the first ever delivered upon that subject in this country. There was also a lecture upon glosso-labio-laryngeal paralysis, perhaps the most hopeless and depressing of all nervous affections. I saw my first case of this disease, which I recognized from this lecture, at St. Joseph's Hospital shortly after coming here. The lectures upon insanity were of a literary rather than a practical type, and more was said about Hamlet and Macbeth than about types and treatment of insane patients. In the old St. Paul Medical College of those days, then located over a saloon on Third street, any man could, and did undertake the work of any other man when need arose. Dr. Stone was Dean of the College and man-of-all-work indeed, lecturing, as he once said, upon every subject save Chemistry, of which he knew absolutely nothing. Dr. Parks Ritchie reported Wheaton as saying of Stone, that the less he knew of any subject, the more brilliantly he could talk upon it.

Almost immediately after I came here, Dr. Stone asked me to finish the course of lectures on *Materia Medica*, because of the serious illness of the professor, Dr. Davenport. I fear



these lectures of mine were not a great success, because I recall very clearly that Dr. Archibald MacLaren and Dr. Edward Spencer, then students, came to one of them and never appeared again. Once was enough! However, the faculty later decided to add a Department of Neurology and Psychiatry to its curriculum. The Professor of Physiology, Dr. Talbot Jones, at first thought of taking this department, but finally decided against it, and the chair was offered to me. Thus casually, almost incidentally, I heard the call of my real vocation and *began to be* a neurologist.

The St. Paul Medical College, however, ceased to exist under that name before the time for my first course of lectures in Neurology. In the summer of 1881 it combined with an additional group of physicians from both cities and was merged into the Minnesota College Hospital, located in the old Winslow Hotel in East Minneapolis, with Dr. Dunsmoor as Dean. This association continued for four years. In 1885 the hospital was abandoned as part of the integral plan of this school which became the Minnesota Hospital College and moved its location to the heart of Minneapolis. The St. Paul members of the staff retired and re-organized the St. Paul Medical School. At one of its Commencements soon after, the address was given by Dr. W. W. Mayo. I knew nothing then of this famous father of more famous sons, but I well recall the instant impression of power and kindliness his personality made upon me.

The Minneapolis College of Physicians was organized in 1883, the Minnesota Homeopathic Medical College in 1886. In the meantime, in 1883, there had been created at the University, the beginning of a Medical Department in the shape of a non-teaching, purely examining body whose function was to safeguard the public by raising the standard of the practicing physician. This important step was followed in 1887 by the Medical Practice Act, creating an independent State Board of Medical Examiners. I do not need to tell you that the state owes this immensely important advance in medical legislation to the late Dr. Perry H. Millard, nor that it was practically the first act of its kind in the United States, and the model since for all legislation upon this subject. There followed a petition to the Regents to establish a first-class

teaching Department of Medicine in the University. Shortly afterward, the faculties of the Minnesota Hospital College and the St. Paul Medical College appeared before the Board to support this petition. In the interest of medical education in the state, they offered to surrender their charters. The members of the faculties offered to donate their services as teachers until the state should feel able to provide salaries, and the Colleges offered the free use of their buildings until the state should provide buildings upon the campus. By these unprecedented acts of generosity the College of Medicine in the University was made possible and medical education in Minnesota became a function of the state.

That is all right. We are all proud of the Medical Department of the University. It is highly creditable to the great state of Minnesota, *but*, ladies and gentlemen, the state of Minnesota did not create that college. Stone, Dunsmoor, Millard\*,—they did the work.

I tell you, the story of medical education in Minnesota, *like any other story worth listening to* (and I hope you younger men especially will note this) is a story of individual effort and personal initiative. Ultimately, the state profits. But the state leads no forlorn hopes, takes no desperate chances, makes no gallant ventures. These things are done by the plain citizen for the love of a cause he adopts. All that honor and his ideals demand of the private citizen, expediency denies to the state.

The state is even, I regret to say, mighty cheerful about accepting individual sacrifices. It used Dr. Dunsmoor's building five years without rent or thanks. It accepted the service of many of us who taught for it, some like myself, for twenty-five years, without recompense,—save that for two years of that time an allowance of \$50 per annum was made for car fare. It not only asked our time, enthusiasm and services, but if any equipment was needed in my department, I paid for it myself, or went without. If you will pardon me for mentioning it, I recall "blowing in" more than a thousand dollars in one year that way, and my confreres

\*Dr. Millard's anxiety for the success of the Medical School during its earlier years was very great. It was a custom of his to quietly slip in during a lecture, in order to size up the presentation of a subject, both as to the responsiveness of the students and the ability of the lecturer—the possible embarrassment of the latter he did not take into consideration.

were all similarly open-handed. Don't misunderstand this. We enjoyed doing it. It was a free-will offering, and we had the time of our young lives working up our respective departments. *But* when I hear this modern talk the young are fond of, in which the state is spelled with a capital and made out a benevolent entity—I smile. Don't tell me it is the state that starts the big things. Men who have lived know better. The state rides home on the last load of hay.

The Minnesota Academy of Medicine originated in a fortuitous meeting, on the train, of Dr. Fulton, Dr. Hunter and myself. We were talking over medical matters in Minnesota, and Dr. Fulton suggested a medical organization composed of men of both cities, having for its purpose the stimulation of the scientific spirit. The suggestion was immediately carried out and the Academy organized.

The history of our medical journals in the last forty years has been one of steady, comparatively uneventful growth, from modest but creditable beginnings to the praiseworthy periodicals of today. Dr. Stone, always a pioneer, founded a small journal in the seventies. It was succeeded by the *Northwestern Lancet*, edited by Dr. Jay Owens. This was ultimately taken to Minneapolis where it became the *Journal-Lancet*, now edited by Dr. Jones. After this the Ramsey County Medical Society published the *St. Paul Medical Journal*, edited by Dr. Burnside Foster. When the State Medical Society finally decided to publish "*Minnesota Medicine*" the *St. Paul Journal* ceased publication.

The development of hospitals among us has been a more strenuous because a more vital matter. The city of St. Paul, the only one with whose hospitals I have been intimately acquainted, was indeed inadequately equipped even for its size in 1881. In name, there were three hospitals then, but you might say one of them was a hope, one a promise and only one an achievement at that time. Minneapolis had two, one of which at least, St. Barnabas, had no operating room, as Dr. Dunsmoor and his associates later equipped one for it on condition of being allowed to use it for teaching purposes.

What a contrast did all these hospitals furnish to the standardized hospital of today, with

its well equipped laboratories, its staff with the monthly discussions of unimproved and obscure cases, its accurate case histories, its cross-index system, its stated inspection, its verification when possible of the carefully worked-out diagnosis by pathological findings—'tis a long cry to the days of forty years ago!

I recall that Dr. Wheaton took Dr. C. T. Clarke, afterward of Stillwater, but then looking for a location, and myself, out to see the City Hospital of which he had medical oversight. It was a very meagre affair, housed in a small building, the former residence of Dr. Stewart, on its present site. It would have taken a more prophetic eye than mine to see in it the germ of the large and thoroughly equipped institution of today. I was youthful and willing to be impressed, but the impression that remained with me was of Dr. Wheaton's courtesy in showing two young strangers what he had there.

The embryo St. Luke's impressed me more deeply because it was obviously the dream of hope, of the Superintendent, Mrs. Bradbury one of the most unselfish and sterling women the Northwest has known. It was housed in a small, square, old-fashioned, flat-roofed house on 8th street. Mrs. Bradbury had a Mr. Tanner, a druggist and factotum, to assist her. Otherwise, she was the entire institution, in one person. As Pinafore then had it:

"The bos'un tight and the midship mite,  
And the crew of the Captain's gig."

She was the superintendent and the matron and the corps of nurses and the dietitian. She was an altruist and an autocrat, as was necessary in an enterprise carried on so entirely under her own cap. The hospital gave excellent care—it could not be otherwise when Mrs. Bradbury did practically all the nursing. No eight hour shifts, no confusion, no neglect, no disregard of orders there! She never spared herself at a patient's expense. I wish I could say as much for all who follow the nursing profession today. I have never forgotten one case I saw there soon after coming to the city. It was general peritonitis. The patient was a girl from "under the bluff" as the red light district was called in those days. It was a pitiful thing—the poor girl talked in her delirium of her family, her home, her former life on the old farm. Mrs. Bradbury



gave her the most unstinting devotion until she died. However life may have treated her, a strong soul companioned her tenderly through the Valley of Shadow.

The original St. Joseph's Hospital was the only real hospital in St. Paul at that time. While small compared to its present superb equipment, it was a going concern. Then, as now, they were efficient. Their present fineness of equipment and readiness for service is due to the wonderful personality and great executive ability of the Reverend Mother Bernardine, than whom I have never seen a more competent hospital official. In those days of small beginnings she showed, as always, the same consideration of the young doctor without following as of the established practitioner, and had, as always, the same kindly thoughtfulness for each individual patient. One of my early cases there was a Canadian with progressive bulbar paralysis, the first case of it I had seen. His condition was tragic, as always in this disease. He could not talk and had great trouble in swallowing, thus making him a difficult patient indeed. I shall never forget Mother Bernardine's thoughtful kindness to him until his death.

A little incident that amused us at this time was a contest between two patients as to which should recover most rapidly. Homeopathy was very popular in those days and there was also much typhoid. Side by side, in the same ward, the late Dr. Henry Hutchinson and I had a typhoid patient apiece. My patient was getting on better than the other man, and he ragged him, boasting of the superiority of the allopathic treatment as shown in his person. Suddenly he grew much worse (I learned later his relatives had brought him grapes and doughnuts to eat) while Dr. Hutchinson's patient shot ahead and made a good recovery to the great glory of the homeopathic school and the disgust of my allopathic patient who had laughed too soon.

Among the good works undreamed of when I came here is the care of crippled children. The establishment of this work is due to the untiring effort of the late Dr. Arthur J. Gillette, who succeeded in getting a Bill through the Legislature providing \$5,000 per annum for the care and maintenance of crippled children whom he offered to treat, himself, free of charge. From this beginning has grown the State Hos-

pital for Deformed and Crippled Children, of whose admirable work I do not need to tell you. Dr. Gillette made Orthopedics in this state, popularized it and made it possible for a tide of beneficent healing to flow to the crippled children of Minnesota. All through the years he was a *perpetual beatitude* to those "whose legs were crooked and whose backs were bad." His was a rugged, virile character, strong yet gentle and kindly—a master builder in medicine.

In 1881 there was no such thing as a trained nurse in the state of Minnesota. I am informed that St. Paul possessed one five years later and that patients vied with one another for her services. Now there are 3500 registered nurses, besides those not so enrolled. Thus the last forty years has witnessed the rise, the fine and full development, and I sometimes fear, the beginning of the decay of this profession,—for nursing is not a *trade*. Among all possible human occupations, it is second only in nobility and helpfulness to that in which we have the honor to serve. Its very hardships make it so. For, as the author of "Holy Living and Dying" once asked:

*"What is there that makes anything worth while save the labor and the danger, the pain and the difficulty?"*

Nurses used to recognize this when they chose their calling. They *knew* they were not selecting a soft snap, an easy job, and they rejoiced in that knowledge. Only those who were willing to give more than was demanded became nurses. This spirit of service made them what they were for thirty years. I owe a debt I can hardly compute to the faithful co-operation of those who have nursed for me through many years. They were, and are, splendid exponents of their profession, examples to the young women now coming on the scene. Nursing no less than medicine demands self-sacrifice as well as character and poise. I wish I were mistaken in thinking that the last five years have changed the spirit of the guild. The nurse should be safeguarded and considered, but as matters are shaping themselves, it is only the very wealthy who can now afford nurses and even they do not receive such service as a nurse once thought it due to her self-respect to give. I do not like to think that any large majority of the younger nurses are only thinking of how much they can

make and how easy a time they can have. But what else are we to believe, facing evidence with which we all come in contact. Said a nurse of the old school recently, deploring these tendencies: "I think the time has come to think a *little* about the patient."

A hospital superintendent was recently unable to get a single nurse out of a *convul* to go to a dying person at 10 o'clock at 10 o'clock—merely because it *was* 10 o'clock. Is this the spirit of service? Is this showing responsibility to the social order? We all know what we think of commercialism in a doctor. Commercialism in a nurse is as deadly a disease as typhus in a patient. Ultimately, if unchecked, it will cripple or destroy the profession.

Nursing began with the nuns, that is, with the *consecrated, unpaid* persons who served for humanity's sake. It would be strange if it were driven back to them. Of one thing I am sure, somehow, there will be a solution of our present, pressing problems. For if the spirit of service has so far gone out of womankind that the sick are to be left untended, then indeed the end of the world is near.

I come now to that particular phase of medical evolution in Minnesota with which I am most familiar—namely, the care and treatment of the insane. This is something, to use the Virgilian phrase: "All of which I saw and a part of which I was", but largely for this reason I do not wish to talk too much about it. You know how it is when you start a man on his hobby. Yet a cursory view of the evolution of this work should be of interest to any doctor.

Forty years ago the notion still prevailed that neurology and psychiatry were two distinct lines. It was thought that nervous disorders were due to a physical base but that mental disorders of pronounced types were more psychologic. We knew nothing in those days of the influence of the ductless glands or toxic causes and infections, and little of the neuro-degenerative taint. Yet personally I always felt convinced that basically the phenomena of both nervous and mental disorders were due to some defect of the central nervous system, and accordingly I opposed the idea when it was suggested that these Chairs be separated at the time the Medical Department was formed in the University. The years have, I think, justified

this contention, since our present term Neuro-psychiatrist exactly expresses this conception.

The supervision of institutions for the insane in this state from 1877 to 1881 was in charge of a hospital commission consisting of two members of the State Board of Health and the Superintendent of the Hospital. The Lunaey Commission, upon which I had the honor to serve for ten years, was created by the Legislature in 1881. The State Board of Charities and Corrections was created in 1883. The work of the Lunaey Commission was medical and advisory and confined to the insane hospitals, while the Board of Charities and Corrections, covering the entire system of public and charitable institutions, represented the public interest in the personal condition of these wards of the state.

As you of course know, the universal history of state care of the insane during the last forty years is one of slowly increasing humanity, lessening of restraint, approximation of normal living conditions, study of pathological data and psychological investigation.

I am glad to say that humanity in our state institutions has always been abreast of the times. Indeed, Dr. Tomlinson, at St. Peter, played the part of Pinel and Esquirol in Minnesota. He did away with restraint at a time when it required initiative and courage to make that attempt. The heads of our State Hospitals have always been upright men, overworked and underpaid. There has never been a scandal in connection with the management of our hospitals. Always the Lunaey Commission was received with the greatest courtesy and given every possible opportunity to arrive at the real status of the patients.

In connection with their work, I should speak of that of Dr. Arthur Rogers at the School for the Feeble-minded at Faribault. This was established in 1882 and Dr. Rogers went there in 1885. He was a very unassuming, quiet gentleman, who did a wonderful work, building up the institution under his care from a small beginning into one nationally recognized for its admirable success in its difficult field. When such men as he work with and for the state, we get results.

There were certain lacks in our system for the insane easily visible to the discerning eye. For these things my confreres and I have fought



together through the years with some measure of success. The chief reforms we urged were voluntary commitment, detention hospitals, an asylum for the criminal insane, an asylum for acute cases located between the Twin Cities, with all modern laboratory facilities, and last, and highly important, a psychopathic hospital.

Looking back through the record of my published activities for many years, I find myself advocating these improvements at many times and in many places, though I was never one to instruct legislators and persuade them to feed out of my hand. I have often wished I had that gift for the sake of Minnesota's insane.

Our Voluntary Commitment law was enacted in 1907. I notice that I first advocated it publicly before the North Dakota Medical Society in 1893—fourteen years earlier. So it will be seen that patience is needed in these affairs. They seldom come because one man pushes a button, but only after continued and multiplied pushing of buttons has drawn the attention of the public and created some kind of public sentiment.

An act creating places of detention in cities over 50,000 was passed in 1901, and Detention Hospitals as State Institutions for the Insane were established by an act of 1907.

The Asylum for the Dangerous Insane was also established in 1907. The asylum for acute cases was never secured. A bill before the last Legislature to establish a Psychopathic Hospital under the wing of the University unfortunately failed in Committee. Twenty-five years ago when I was in Edinburgh, taking special work under Sir Thomas Clouston, I met Ford Robertson, who had just left Clouston to become pathologist to the Royal Asylums of Scotland, and he infected me with his own faith in the role such work was to play in the future. This was long before the establishment of any psychopathic hospital in the United States. Returning home, as Chairman of the Lunacy Commission, I advised as vigorously as might be, the employment of a competent pathologist with headquarters and laboratory facilities at the University, but in touch with all asylums and assisting at their postmortems, who should instruct the asylum medical men as to pathological findings—a center of research activity, as it were. This also did not come to pass. But the

psychopathic hospital (when established) will do the work upon a bigger scale. It will throw all possible light upon the pathological conditions of insanity, its diagnosis and treatment.

On my return from this trip, I brought with me a complete equipment for a private laboratory. This was placed in the present Free Dispensary building in St. Paul then used as the University dispensary. This was the first private laboratory of neuro-pathology in the state. Among those who had charge of it at different times were Dr. Louis B. Wilson, now of Rochester and Dr. Frank M. Manson of Worthington, while Dr. Walter B. Cannon, now of Harvard, worked there for two months one summer.

I recall two cases whose neuro-pathology was carefully worked out by Dr. Wilson, then just beginning his brilliant career in pathology. One was a patient of Dr. Chas. Lyman Greene, a case of Landry's Paralysis from the City Hospital. The patient had been kept alive for almost a week by artificial respiration. The other case was a patient of my own, suffering from pernicious anemia, with paraplegia. Dr. Wilson made sections throughout the entire cord. I reported the case before the American Neurological Society of that year. This was one of the earliest contributions made in this country to the neuro-pathology of the disease, for at that time very little was known about the combined scleroses associated with this trouble. The first contribution was made by Putnam of Boston in January 1891. Three months later, Dana of New York reported a case. Five years later in June 1896, I reported the case I have just referred to: Dana's second case was reported in 1899.

May I say a word or two about one of my beliefs? You may smile at it if you will, but I believe that the day of neuro-syphilis is far spent. It is too late to cure paresis and tabes when they are established, but there is a time when it is not too late. Forty years ago the spirocheta pallida had not been dreamed of, but Metchnikoff, Schaudinn, Wassermann, Ehrlich, Nonne, Noguchi, Swift and Fordyce have lived and wrought; prevention and prophylaxis until their coming futile is now an ultimate certainty.

According to Solomon, every case of syphilis of the central nervous system points "an accusing finger to some member or members of

the medical profession, who have somewhere, sometime or somehow failed to do their duty by that case."

All the more important new discoveries along this line should be passed on to the general practitioner as speedily and as emphatically as possible. He is the sentinel at the gate, for the work is up to him.

In saying this, I find myself at the door of the future before I am fairly out of the past. Reminiscence and prophecy go hand in hand.

It is not in medicine only that affairs have changed vastly in forty years. All human life shows changed conditions, due on the one hand to scientific progress and on the other hand to industrial development. But because *our work* brings us so vitally close to men and women, it is even more affected than other professions by the big changes.

We are witnessing today the early development of two movements destined to affect medical practice profoundly, one of them perhaps to its glory; the other, I fear to its shame. There can be no doubt, I think, that the so-called "socialization of medicine" will ultimately work the doctor's degradation and possibly the patient's dissolution. You will recall the warnings indicated in Dr. Andrew's excellent report to this body upon this subject last year and Dr. Hoffman's convincing address to you upon "Compulsory Health Insurance and the Medical Profession." The question of good medical attendance for those too poor to pay for it is very far from being solved satisfactorily by any attempts yet made in "state medicine" in England or Germany, the countries which have experimented most freely along those lines. The fact that five minutes is the average time of attention an English doctor can give to any case in his "panel" is sufficiently illuminating as to the way it works out there. This brand of service harms both him who gives and him who takes. Our own confessedly inadequate method of free clinics and free dispensaries has at least the advantage of furnishing expert attention ungrudgingly given, though it does not reach all cases.

Two outstanding facts about medical attention which politicians, legislators, would-be

philanthropists and sometimes even doctors themselves forget, are these:

*Medical attention is not a commodity;*

*Medical attention cannot be wholly standardized.*

I wish to underline these statements. Labor, which objects to being called a commodity itself, must ultimately realize that medical attendance, being a much more highly evolved and complex affair, is even less a commodity than itself. Any attempt to treat it so will finally end in disaster. I trust that the working of this obvious law will ultimately take care of the ill-advised experiments in "state medicine", but politicians and agitators being what they are, these experiments should command the watchful scrutiny of the profession.

The other movement to which I would allude is that toward group medicine, and this movement increases rapidly in the profession today. Group medicine is based on the realization that the practice of medicine is an ever increasing complexity and it is an attempt to place at the command of the patient every known scientific aid at the least possible cost. Disease, other than acute infections, is usually a complex, often requiring the consideration of more than one specialist. Also, its diagnosis today demands analytical and laboratory facilities far beyond the ability of the average physician to furnish. These things must either be done outside the office, or the office must be so organized as to include these facilities. We are still in the experimental stage of this movement, and groups associate on various differing principles. The search, of course, is to find the precise principle of association and form of management which will serve the patient most efficiently and economically, with advantage to the physician also. Minnesota possesses a unique example of the clinic idea—few, if any experiments in "group medicine" are ever likely to achieve the startling success of that one. There is one Rochester, two Mayos and the town is a world Mecca, but the conditions that have shaped the Mayo Clinic are too exceptional ever to be repeated. The ordinary clinic must be content with less spectacular success. Nevertheless, I have faith that the profession will work this problem out successfully. In five years time, or ten, we shall



know how best to make group-medicine of service. And only as it serves will it succeed.

I think I see, however, from the vantage ground of forty years of medical practice, two dangers which menace the efficiency of group-medicine, and I would like to call your attention to them. One is the danger of too much stress on diagnosis to the neglect of therapy. What a patient really judges us by in the long run, you know, is whether we help him to feel better without costing him too much. The care we give, to finding out what really ails him, goes over his head. It is all vanity and vexation of body unless he improves. In this connection I wonder how many of you noticed a little anecdote Dr. Frederick Peterson introduced in an article printed in the A. M. A. last year. Says Peterson: "I met a patient who had most of the diagnostic tests tried on him and he said the experience was most impressive. I asked what the doctor had done for him as a result of these labors. He said, 'he gave me rhubarb and soda, and when I told him that was just what my doctor in Skaneateles had given me long ago, he said, it was not rationalized, not scientific. Then I said, rationalized rhubarb was having a wonderful cathartic effect on my pocketbook.'"

The other danger of group-medicine—and on this I would lay even more emphasis—is that of the elimination of the doctor's personality, of his unique and vital relation to his patient. You do not need to be told that it is somewhat the tendency of group-medicine to obscure and overlay these things, but perhaps the younger men among you do not fully realize the part they play even in therapy.

I have just told you of my memories of the Minnesota doctors of forty years ago. Their *personality* was the biggest of their gifts to their clientele. Big-hearted, big-brained men inspire in their patients the *will to live* and this is fundamental therapy. Think of the miracles the country doctor of our early days performed. I came near trying to be one, though perhaps I might not have pulled off the miracles. Had it not been for Dr. Stone's advice, I might have settled in the village of Brunersberg, Ohio, a hamlet of less than fifty souls. My elder brother, if you will allow me the reference, was

a small town and country doctor to his death. He used to drive about the drifted roads in winter when it was so cold his breath congealed on his eyelids and froze them shut, and the old white horse made the needed stops of her own accord. I know and honor such work as he and others like him did among those people and in those conditions. We cannot claim to excel them in human usefulness. With all our scientific progress and standardized procedure, we have not passed—and shall not pass—beyond the need for the *qualities* those men so fully possessed.

Routine procedure can be standardized, but standardization and science will only take a doctor half way to his goal. *Medical judgment* remains forever individual—and *medical judgment and personality* are the crux of the whole matter. If a man has all else, and has not these, it is as nothing.

I am not saying that insight and personality are better than scientific procedure, but I *am* saying that the latter is lifeless without them. We must have both and have them in full measure.

When I left college forty-four years ago, my graduating essay was about "The Physician of the Future." Heaven knows what I thought or said about him. But I know today what I think of the physicians of that future which ever recedes as we advance—that something brave and gallant, faithful and inspiring, which I felt so strongly in our Minnesota men of forty years ago, that *must be* a vital part of them. There is no doubt that modern conditions, and even our priceless scientific progress, tend to obscure the age-long ideals of our profession. We must fight to keep them, tooth and nail. For—I do not believe,—I *know*, that only as we hold intact our great traditions, shall we duly serve our public and save our souls alive. Now, as never before on earth, must men who are trusted by other men as we are, keep faith with our own past. From commercialization, socialization and selfishness, Good Lord deliver us!

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# THE TREATMENT OF POLIOMYELITIS WITH IMMUNE HORSE SERUM BY VARIOUS PHYSICIANS\*

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After the apparent value of my immune horse serum had been demonstrated at Davenport, Iowa, in 1917<sup>2</sup>, it and subsequently prepared serums were sent to various physicians on request, with the understanding that the results they obtained should be reported to me. I shall summarize here briefly the symptoms, findings, and results recorded in these reports.

A card for each patient treated and a circular letter were sent with each batch of serum. The chief items of information asked for on the card were the sex and age of the patient, the condition of the teeth, tonsils, cervical glands, and adenoids, a description of poliomyelitic symptoms and the date of onset, the extent of muscular weakness and paralysis, and the date of their onset, the spinal fluid findings (amount withdrawn, cell count, and globulin test), the method of serum injection, the date on which the serum was injected and the amount given, the effect, if any, on the temperature, pulse rate, and other symptoms, the immediate and late results with regard to the arrest of progressive paralysis, restoration of muscle function, exposure to other patients, whether or not more than one member of a family was affected, and whether there were other cases in the community. Reports on the use of the serum in 128 cases have been received and analyzed. Considering all the facts there was no reason to doubt the diagnosis in any of these. Most of the cases occurred in various parts of the United States, chiefly during the summers of 1918 and 1919; treatment was given in a smaller number of cases in 1917 and in 1920. Sufficient time had elapsed at the time the reports were made so that the ultimate outcome in all the cases could be determined. Most of the cases occurred in July, August, and September of each year.

A history of exposure to patients known to

have poliomyelitis was obtained in eleven cases. More than one member of a family was affected in ten cases. Other cases were noted in the community in forty-five of eighty-six cases in which information was reported on this point, while forty-one cases occurred sporadically.

Abnormal conditions around the teeth were reported in nine cases, infected and enlarged tonsils in thirty-seven, the presence of abnormal accumulation of adenoid tissue in twenty-two, and enlarged cervical glands in twenty-four. The tonsils had been removed in seven cases, and the adenoids in six.

The serum was usually injected intravenously or intramuscularly, but occasionally both methods were used in the same patient. Thus, in eighty-eight cases in which the method of injection was reported, thirty-five patients were injected intravenously, thirty-eight intramuscularly, twelve intravenously and intramuscularly, and three intraspinal and intramuscularly. Altogether 117 intravenous injections, and 103 intramuscular injections were given. Immediately before the injection of the first dose of serum spinal puncture was made for diagnostic tests and to aid in draining antibodies contained in the serum into the spinal canal. The serum used included some of each batch which I used in the treatment of cases in the epidemics at Davenport and Dubuque, Iowa, and in sporadic cases. The table contains a summary of the important facts in each of the three groups.

*Group 1.* None of the twenty-three patients in this group died, and only one developed slight paralysis, which localized in the right deltoid, and later disappeared completely. Early good effects, such as diminution in temperature and pulse rate, lessening of the rigidity of the neck and spine, twitchings of the muscles, and abnormal drowsiness, were noted in twenty-two patients. The duration of the disease at the time of treatment was from twelve hours to four days; the average was one and five-tenths days. The cell count in the twelve cases in which it was recorded ranged from 10 to 240; the average was 105. The ages of the patients ranged from two years to sixteen years; the average was five years. The average total amount of serum given was 22 c. c.

*Group 2.* None of the twenty-seven patients

\*Presented before the Southern Minnesota Medical Association, Winona, June, 1921.



in this group died, and all but one recovered without residual paralysis. This patient had had paralysis in the extensors of the right foot, and complete paralysis of the entire right leg for two days when the serum was first given on the fourth day of illness. The cell count was 42, and only 12 e. e. of serum were injected intravenously. Early good effects of the serum were noted in twenty-five cases, while in two, in which the serum was given on the third and fifth days, it appeared to have no effect. The average duration of the disease at the time of serum treatment was two and five-tenths days. The cell count in the seventeen cases in which it was reported ranged from 16 to 175; the average was 69. The ages of the patients ranged from one year and three months to twenty-two years; the average was six and seven-tenths years. The average total amount of serum given was 28 e. e.

*Group 3.* Six of the seventy-eight patients in this group died; nineteen recovered with residual paralysis, and forty-one recovered completely. The late results concerning twelve are not known. Early good effects of the serum were noted in forty-four patients; doubtful or no apparent effects were noted in nineteen. In all but two of the latter the serum was given in from four to fourteen days after the onset of the symptoms. The average duration of symptoms at the time of treatment in this group was six and three-tenths days. The cell count in the thirty-nine cases in which it was recorded ranged from 10 to 700; the average was 113. The ages of the patients ranged from nine months to forty-five years; the average was eight and four-tenths years. The average total amount of serum injected was 37 e. e.

The first serum injection in the patients who died was made on the third day in one, the fourth day in three, and the sixth day and ninth day in one each. The ages were respectively four, seven, eleven, fourteen, fifteen, and twenty-seven years. The amount of serum given was 5 e. e., 10 e. e., 30 e. e., 40 e. e., 40 e. e., and 130 e. e. respectively. Respiratory involvement was already present at the time of the first injection in four, complete paralysis of all extremities, with inability to swallow, in one, and almost complete paralysis of all extremities in one. The

patient who received only 5 e. e. of serum was practically moribund on the fourth day of illness from an ascending paralysis, and no beneficial effects were noted. In the three others in whom paralysis had extended to the respiratory muscles, on the third day in one, and on the fourth day in two, improvement, such as relief from pain, lowering of temperature, and improvement in respiration, occurred soon after each injection; the slight extension in the medulla caused death in from twenty-four to thirty-six hours after the last serum injection. The patient who was completely paralyzed and unable to swallow improved in ability to swallow after each of two serum injections, given on the sixth and seventh days respectively. No apparent effect was noted in the patient with ascending paralysis; the serum was given on the ninth day of the disease.

In the analysis of the cases in this group according to complete recovery, or recovery with residual paralysis, it was found that the age of the patient, the cell count, and the amount of serum given were about the same in all. The average age in the former was seven and two-tenths years, in the latter eight and three-tenths years; the average cell counts were 89 and 76 respectively, and the average total amounts of serum given were 37 e. e. and 34 e. e. respectively. There was no apparent difference in the severity of the early symptoms and other findings. The only striking difference was in the time of the treatment. The average time of treatment of patients who recovered completely was four and six-tenths days after the onset of the symptoms, while of those in whom paralysis remained it was ten days.

#### SUMMARY OF RESULTS

Six of the 128 patients treated died, a mortality of 4.7 per cent. The serum treatment was given to all of these after extensive paralysis had developed. Twenty have residual paralysis. In twelve the late results are not known, but, granting that they all have residual paralysis, the total would be 32 (25 per cent). In all but one of these the paralysis was marked at the time of treatment. In the judgment of the physicians giving the serum, early good effects were obtained in ninety-one cases; no apparent effects were recorded in twenty-two cases. The

average duration of the disease at the time of the serum treatment in the 128 cases was four and six-tenths days; the average cell count was 102. The average age of the patients was seven and four-tenths years. The average amount of serum given was 32 c. c. Of 123 patients whose sex was recorded, sixty-six were males, and fifty-seven were females.

The amount of spinal fluid withdrawn from any one patient varied from 2 c. c. to 60 c. c., depending on the pressure and the age of the patient. The average amount withdrawn from the patients in Group 1 was 9 c. c., in Group 2, 18 c. c., and in Group 3, 17 c. c. The average in the three groups was 12.8 c. c. In all but four patients the globulin test was positive when the cell count was increased. In these the spinal puncture was made on the first, second, fifth, and ninth days, and the cell counts were 60, 51, 15, and 11 respectively.

The intervals between the time of the onset of symptoms and the onset of paralysis in the patients in Groups 2 and 3, in whom paralysis had occurred before the serum treatment was begun, were approximately the same. Of the patients in Group 2, those with slight paralysis, muscular weakness began on the second day in 25 per cent, on the third day in 36 per cent, on the fourth day in 25 per cent, and in the others on the seventh and eighth days. Of the patients in Group 3, those with advanced paralysis, 6 per cent developed muscular weakness on the first day, 18 per cent on the second, 30 per cent on the third, 20 per cent on the fourth, and the others, one each on the fifth, sixth, seventh, eighth, and ninth days. The duration of the symptoms until the onset of paralysis in the six patients who died was one, two, four, five, six, and seven days respectively. The early symptoms, such as headache, vomiting, twitchings, and rigidity of the neck and spine, were equally severe in the three groups, and the temperature and pulse rate were about equally high.

When the serum treatment was given during the febrile period the temperature usually dropped gradually from the day of the first injection, and it became normal in from two to three days. In some instances there was no apparent effect on the temperature curve. The pulse rate lowered coincidentally with the tem-

perature, and usually was not affected when the temperature was not diminished.

A rise in temperature soon after the injection of serum occurred in six cases in a total of 231 injections. This was usually interpreted as evidence of toxicity of the serum, but since it occurred only in patients who had fever at the time of the treatment the rise may have been due to some other cause. Acute anaphylactic reaction was not reported. One child was delirious for a few hours and one had a convulsion; both recovered without residual paralysis. Twelve patients (about 10 per cent) developed urticaria or serum sickness as a sequel.

In every instance in which physicians had an opportunity to treat patients early and late in the progress of the disease, recovery, both of symptoms and muscular power, was more prompt and more nearly complete when the serum was given early in the attack than when it was given late. This fact was forcibly emphasized in the instance in which two children of about the same age, in the same community, contracted poliomyelitis at about the same time. The child with a low cell count (31), in whom the serum treatment was begun on the sixth day, when respiratory embarrassment was already present, died. The other child, whose early symptoms were almost identical and who had a higher cell count (170), received the serum treatment on the second day, just as muscular weakness was developing, and recovered without residual paralysis.

The outcome, both with regard to death and restoration of muscle function, in the patients treated is far better than that noted in the patients not treated. Of a total of seventy-two patients not treated whose cases have been studied, nineteen (25 per cent) died of respiratory paralysis. This does not include eleven patients treated whose cases were hopeless. If these are added, the mortality is 36 per cent. The final outcome of twenty-five of the patients untreated was determined. Of these fourteen (56 per cent) had varying degrees of paralysis.

The incidence of residual paralysis in the patients treated is much less than was the average of paralyzed patients in a large number of epidemics summarized by Wickman<sup>4</sup>. Thus, in



TABLE I

Summary of results in patients treated by physicians to whom serum was sent on request.

| Condition of patient   | Patients | Deaths | Recovery with residual paralysis | Complete recovery | Recovery without developing paralysis | Early good effects. | Late results unknown | Effects doubtful or not apparent | Average cell count | Average duration of disease at the time of first serum treatment | Average age | Average amount of serum given to each patient |
|--|----------|--------|----------------------------------|-------------------|---------------------------------------|---------------------|----------------------|----------------------------------|--------------------|--|-------------|---|
| Group 1<br>Patients without paralysis at the time of serum treatment       | 23       | 0      | 0                                | 23                | 22                                    | 22                  | 0                    | 1                                | 105                | Days<br>1.5  | Years<br>5  | C.c.<br>22                                    |
| Group 2<br>Patients with slight paralysis at the time of serum treatment   | 27       | 0      | 1                                | 26                | 0                                     | 25                  | 0                    | 2                                | 69                 | 2.5  | 6.7         | 28  |
| Group 3<br>Patients with advanced paralysis at the time of serum treatment | 78       | 6      | 19                               | 41                | 0                                     | 44                  | 12                   | 19                               | 113                | 6.3  | 8.4         | 37  |
| Total  | 128      | 6      | 20                               | 90                | 22                                    | 91                  | 12                   | 22                               | 102                | 4.6  | 7.4         | 32  |

Wickman's compilation of 1405 cases, residual paralysis occurred in 970 (68 per cent). Moreover, it is far below the incidence of residual paralysis reported for the 1916 epidemic in New York City<sup>1</sup>; 67.4 per cent of 2715 patients studied at random were found to have residual paralysis.

It should be stated that nearly all physicians who had opportunity to observe the effects of the immune horse serum became convinced that it possesses definite and often striking power to prevent paralysis, and that it is of definite benefit if given within thirty-six to forty-eight hours after the onset of paralysis, but if given after that it is of less value.

The results in this series of cases corroborate in detail those which I obtained in the epidemics at Davenport<sup>2</sup> and Dubuque<sup>3</sup>, Iowa, and in sporadic cases since that time in which the primary data were obtained first hand.

The conclusion that my immune horse serum has curative power in poliomyelitis, especially in the early stage of the disease, is warranted, and its general use in the treatment of this dread disease is indicated.

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## DISCUSSION

DR. S. MARX WHITE, Minneapolis: I doubt whether any of us feel competent to discuss the paper of Dr. Rosenow with any great degree of intelligence. I have not had the opportunity of attempting to use the serum as he has indicated, but I have had the opportunity to see a good deal of his material and to study it, and the thing that appeals to me is the remarkable persistence with which Dr. Rosenow has followed out the lesions of this disease. The one point of considerable difficulty which has developed in repeating Dr. Rosenow's work seems to

be the inability of other workers or unwillingness to repeat exactly his methods, and if my understanding of the situation is correct, the repetition of his results depends upon the most meticulous following of the methods of cultivation and isolation that Dr. Rosenow has been responsible for the development of. The idea which underlies all of this work, the selective activity, the development of bacteria is one which he has been so largely responsible for and which so many other workers find difficulty in accepting or following. I am confident, however, from the care with which Dr. Rosenow has conducted all this work, from the hundreds of checks he has made, when the time comes that others are willing to follow out his methods, his results in very large part will be duplicated.

I am interested in what he said with relation to placing the serum in places where it will be accessible, and as a member of the State Board of Health I am glad to have the suggestion that it is possible to place some of the material in the hands of the laboratories of the Board, so that it will be readily accessible, because the laboratories are making every attempt to have sera in stock and ready for immediate and prompt shipment. In that connection I would like to ask Dr. Rosenow as to the period during which this serum will be potent. Most sera for a certain time retain their potency in a usable degree, but after a certain length of time they are no longer safe or useful, and if Dr. Rosenow has any knowledge as to the length of time the serum would be useful after its manufacture, I should like to have him tell us about it.

DR. EDWARD C. ROSENOW, Rochester: I have had apparently good effects two years after the serum was made. Its efficacy is comparable to antipneumococcus serum, more so than antistreptococcal serum. If kept cold, it lasts for a long time, so that it is not impossible to stock it in various places and have it immediately available for the treatment of patients.

DR. D. B. PRITCHARD, Winona: While I have had considerable clinical experience with cases of poliomyelitis, I am not competent to discuss Dr. Rosenow's paper. There is one phase I am curious to get some light on. It seems to me, the results we get from the serum may or may not be true, judging by the statistics we saw given on the screen.

About six years ago in 1916 we had here in Winona quite an extensive epidemic of poliomyelitis. This epidemic was probably as extensive as it was anywhere in the country in proportion to the population. As I remember, we had in the neighborhood of 75 frank paralyzed cases of poliomyelitis. We had at the same time a most unusual number of young people who were ill with symptoms of poliomyelitis without paralysis. I think every practitioner of Winona in this audience will verify what I am about to say, that for every frank case, we had in the neigh-

borhood of 10 cases of poliomyelitis which we could not swear were poliomyelitis, but were satisfied that they were cases of that disease. These cases occurred in the families without frank cases. Some of them would have all the symptoms except frank paralysis. We had poliomyelitis cases at all ages, from early childhood up to middle life or older. We had in the neighborhood of a thousand cases of poliomyelitis that summer, and if we had used the serum it would have been considered very valuable. We saw case after case that we believed was poliomyelitis with absolutely no paralysis following. The thing I am in doubt about is the result of these statistics we saw on the screen of something like 117 cases. While I do not want to say this serum is of no value, I know some of the sera are valuable, particularly pneumococcus antigen. There is nothing on earth, except diphtheria antitoxin, that is more valuable than Rosenow's pneumococcus antigen given early. With that in mind I have the greatest respect for Dr. Rosenow's methods and his discoveries, and I would not say that this serum is not all right. In Winona we had another epidemic some years ago which was not so extensive; at the same time we had a lot of other cases ill, and no one was able to make a diagnosis in those cases. Had we been using serum in the 1916 epidemic we would have been justified in believing it a wonderful remedy, curing at least 90 per cent of the cases in a few days.

DR. W. E. BROWNING, Caledonia: I have listened with much interest to this splendid talk of Dr. Rosenow's on this very important subject. It is one that appeals to us as country physicians, and I want to put on record six of these cases we have had in the last year, four of which were treated with serum. For instance, one case was a little child who very early developed paralysis of the respiratory muscles. The next two cases were rather severe to use the serum on. They lived, and we noticed at the time almost immediate improvement after using the serum, but they are maimed. Their forearms are all right. In two other milder cases we used the serum, and one cleaned up with only a little squint at the time, and that has cleared up since. The other child had definite paralysis on the right side of both arm and leg, and that has practically cleared up. Another case was one with the lesion only affecting the pharynx and larynx, and that cleared up entirely with the use of the serum. This proves to my mind the usefulness of the serum. I think so much of the serum that if I had another case I would use the serum as soon as I could get it, because there is no doubt we get benefit from it. It has got to be used early, and the earlier it is used the better the results will be.

DR. H. F. HELMHOLZ, Rochester: I would like to add a word of appreciation of Dr. Rosenow's very excellent work. As clinicians we must consider that only if we make a diagnosis early in poliomyelitis



will we be able to benefit our patients. As Dr. Rosenow has pointed out, all pathologico-anatomic work on this subject has shown that once damage is done, no amount of serum or anything else can restore the anterior horn cells. It is only in those cases in which the cells are not yet destroyed that we can hope to accomplish anything by the use of serum. This means, early diagnosis.

It is a well known fact that poliomyelitis without paralysis occurs during an epidemic. Not only are there patients without paralysis, but persons coming in contact with patients with poliomyelitis became carriers of the disease. It is only in the severe cases that paralysis develops. If a child under my care had the general symptoms of poliomyelitis without paralysis, and the spinal fluid showed the findings associated with this condition, I would not hesitate to give the serum. It is only in the early stage that we can hope to accomplish anything with the serum, which means that during an epidemic we must do lumbar puncture in all suspicious cases in order to make the diagnosis at a time when the serum is of some use.

DR. EDWARD C. ROSENOW, Rochester, (closing): Abortive cases such as those mentioned by Dr. Pritchard are more numerous in some epidemics than others, and make the evaluation of the effects of any form of treatment very difficult. Fortunately the spinal fluid findings differentiate quite clearly, as Dr. Helmholtz has emphasized, these cases from those in which there is involvement of the central nervous system. During the epidemic at Dubuque I made spinal punctures in eleven patients who presented clinical evidence of poliomyelitic infection, but in whom little or no evidence of localization in the central nervous system could be elicited. Most of these were in families in which frank cases of poliomyelitis occurred. The cell count in one was 5, in one 3, in one 2, and in the others no cells were found. The globulin test was negative in all. The punctures were made on from the second to the seventh day after the onset of symptoms in all but three. In one of these it was made twelve hours, in one eighteen hours, and in the third twenty-three hours after the onset on the symptoms. In a few of these cases I have been able to demonstrate the presence of the pleomorphic streptococcus in the throat, just as Flexner and Lewis have demonstrated the presence of virus.

The cases in which the serum treatment was given were not of the abortive type, but were frank cases. The symptoms and spinal fluid findings in cases treated early were as marked as in the cases in which paralysis had occurred. It would appear that the absence of death and the almost total absence of paralysis in the former group, must be due to the serum injected.

OBSERVATIONS ON ANGINA PECTORIS<sup>\*</sup>

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As we approach the twilight of our professional career, no matter how limited our medical horizon, our attention is irresistibly and inevitably drawn to a contemplation of the action both in ourselves and in others of the great central organ of life, the heart. I am led to write this paper by a remark of Sir William Osler that one third of his angina patients were physicians.

The exact mode of causation of an acute angina attack is one of the most disputed points in cardiac pathology. It is not a disease but a symptom complex. The name angina pectoris, literally, anguish of the breast, given by Dr. William Heberden in 1768 and 1782 is quite applicable and his original observations after much research, I have found. "Those who are afflicted with it are seized whilst they are walking and more particularly when they walk soon after eating with a painful and most disagreeable sensation in the breast which seems as if it would take their life away if it were to increase or to continue. In all other respects the patients are at the beginning of this disorder perfectly well and in particular have no shortness of breath from which it is totally different."

Hippocrates refers to painful affections of the breast, while the Roman philosopher Seneca in his 55th letter gives a graphic description of undoubted anginal symptoms in his *Meditatio Mortis*: "To have any other malady is to be sick, to have this is to be dying." Seneca emanated this expression, "Man does not die, he kills himself by eating."—True even in this day and generation.

Balfour's description is the most striking, "A mailed hand grasped the chest in the cardiac area and squirted through its fingers flashes of excruciating agony." The painter Durer, himself a sufferer, depicted the disease in a picture. "Der Tod als Freund."

John Hunter, Charles Sumner, Charles Dickens, Charchot, Matthew Arnold, the evangelist Moody, Nothnagel, William Pepper were distinguished sufferers.

<sup>\*</sup>Presented before the Minnesota State Medical Association, Minneapolis, October, 1919.

It is essentially a disease of middle life or later, though some cases have been reported in the young. Albutt quotes a rheumatic case at seven and others at ten years. Wild relates cases in a girl of ten and another at twelve years in whom were found advanced diseases of the coronary arteries. Heberden stated, "I have seen nearly a hundred people under this disorder of which number there have been three women and one boy twelve years old. All the rest were men near or past fifty years." It is a disease of the aorta and coronary arteries and based on definite pathological conditions. The terms, pseudo-angina and functional angina, should be abandoned in any description of the malady. They represent a wide variety of disorders.

*Etiology.*—There are five great causes, in order of frequency. Syphilis is by far the most active and frequent; it attacks so often the aorta, the seat of angina disease. Rheumatism, arterial sclerosis, gout, and influenza probably are the next most frequent causes.

I once remarked that sexual desires in the most of us have become merely a matter of historical importance. Yet I have seen a genital chancre in a practitioner of sixty acquired in ill spent time when he should have been reading the Bible or Taylor's "Holy Living and Dying." Then, the matter of accidental syphilis is ever present with us. Syphilis is much more common than supposed. It is by far more frequent in the community than tuberculosis. Ten per cent of all hospital cases have the disease and the percentage is rapidly increasing.

Arterial sclerosis comes next in frequency. We are on the crest of a great cardio-vascular wave, says one writer. Our knowledge has greatly advanced in the last twenty years. In the majority of hyperpiesia cases arterioma of the aorta-coronary area eventually becomes established. A defective aorta with high blood pressure is a frequent cause of angina. Take ourselves as physicians, the wear, tear, and strain on our arterial leather is terrific, and no wonder circulatory disease is so common. At forty we often carry the burden applicable to an age of sixty years. Worry is the disease of the age. "He that is of a merry heart hath a continual feast."

Rheumatism, I defined years ago, as a galaxy of diseases not yet differentiated. Now we consider it practically a sepsis, originating usually, in the tonsils or teeth. It is the cause of angina in early life. The wholesale removal of tonsils at present should not be ridiculed, even if an occasional healthy gland is removed. It fulfills the dictum of Adam Smith, the greatest good to the greatest number. I would advocate the removal of all enlarged tonsils in children under state supervision and at state expense.

Influenza occasionally causes an acute aortitis. This I observed several times during the last epidemic;—fullness in the right upper sternal region with substernal pain varying in degree from an uncomfortable condition to agony itself. Several cases of angina following influenza have been reported, with a few sudden deaths.

Gout with the incident arterial changes is frequently in its later stages associated with angina.

Tobacco is usually mentioned as a cause of angina. It may cause an irregular pulse, vertigo with severe cardiac pains, but never a true angina. A man aged 34, a great smoker, developed attacks of angina and died in one attack. Fortunately a necropsy was performed, revealing extensive syphilitic lesions of the aorta, partly closing the openings into the coronary arteries. There is no evidence that tobacco can produce angina but it can aggravate an existing tendency.

All angina cases are worse in cold or stormy weather. Certain meteorological conditions apparently precipitate the attacks. One of my patients, a prominent lumberman, would have distressing seizures during storms with subzero temperature. On my advice he removed to Pasadena and lived over ten years in comfort, dying of some other malady.

Persons with anginal symptoms are rendered worse by association with a marked case. The physicians of Charles Sumner and Chareot, died of this disease. Others in perfect health may assume an imitative form, usually hysterical in character, and, in Christian Science parlance, must change their thought to get well.

*Symptoms.*—The symptoms of a typical attack exhibit a marked diversity. There is usu-



ally a fixed attitude, slightly bending as if to relieve the feeling of oppression. The sufferer may assume that of a man attempting to throw off an incubus, resembling Laocoon in the celebrated group. Instead we may have a variety of movements such as pacing the floor, or the recumbent position.

The face is usually pale but may be flushed or even cyanotic. The skin may be dry or covered by perspiration. As a rule dyspnea is not present. Sometimes as in the case of John Hunter, they breathe only by an effort of the will. Yet a deep breath often gives relief. "A fearsome, restless fright begins to fill the mansions of my soul," says Gerontius.

There is a sense of impending death. One patient remarked he felt an intense curiosity; to be translated or not was the question. An intense paroxysmal pain usually in the upper sternal regions, may radiate to the left arm, right arm, or both; to the fingers, neck, lower jaw or behind the ears, to the larynx, abdomen, testicles or legs. Rarely the arms become benumbed with loss of power and the fingers feel dead. A sense of suffocation is sometimes manifest, and constriction of the throat.

Epigastric angina is responsible for many sins. Some stomach specialists have industriously rubber-hosed and irrigated such cases with no striking results except an occasional sudden death. Always contemplate gall stones, gastric ulcer, or even appendicitis, embolism, gout, and angina in pit-of-stomach pains and differentiate carefully between them. In coronary thrombosis, the pain is most severe in character with signs of shock and collapse; the pain may continue for hours and the attack is usually fatal.

Angina is not so frequent in women and is often overlooked with the diagnosis of hysteria. A woman in my City Hospital ward had been in various institutions with the invariable designation of major hysteria. During an attack, I observed she clutched her upper sternum and also had irregular pupils. Her sixth Wassermann was positive and she died of a typical angina. A woman may have pronounced hysterical manifestations underlaid by a serious organic disease.

The pulse is, as a rule, unaffected but may

become small, soft and scarcely perceptible. A tightness across the chest on exertion is all that some complain of.

Blood pressure reports are at great variance. One case, normally 150 systolic, was 210 during the paroxysm. In syphilitic cases, there is usually no change.

Flatulence and gastric distension occurs in almost all cases,—a cardinal symptom. The wind and the pain may be discharged together. One paroxysm was precipitated by eating raw onions, probably a just punishment.

*Diagnosis.*—A typical seizure is readily recognized. The anxious, pale, gray countenance, may be flushed; the shallow breathing, fear of impending death, fixed position, upper sternal pain radiating to the arms, shoulders, neck or back are classical. Waves of pain from the upper abdomen to the sternum, with nausea and great weakness, also acute pulmonary symptoms may be associated. Pain may occur in the pectoral muscles. Intermittent claudication is occasionally observed.

Intercostal neuralgia is frequent in the weak, neurotic, anemic young women exhibiting the tender nerve points of Valleix and other stigmata.

Herpes zoster curiously is sometimes confounded with angina.

Cardiac pain in a young man with a history of syphilis almost invariably means angina.

The pain starting from the epigastrium is prone to mount up behind the sternum. There are three special occasions for angina: muscular exercise, as walking up-hill or against a wind; sudden mental emotion; and impeded digestion. A heavy dinner after severe mental or muscular exercise is dangerous. Some think it is initiated by a sudden strain on the left ventricle.

Josue obtained positive Wassermann tests in 33 per cent of his angina cases but 90 per cent were benefited by mercurial treatment. Arspheamin does not answer as it may bring on serious disturbances with aortic lesions. Ewart has recently stated the spirocheta pallida may be found in abundance in the cardiac tissues and yet be absent in other parts of the body.

Where rest and nitrites markedly benefit, angina must be considered as probable. Willis

states that there are no electro-cardio-graphic findings pathognomonic of angina pectoris.

*Prognosis:*—The prognosis is always uncertain, usually grave in character. "Experience is fallacious and judgment difficult." Probably not so unfavorable as formerly considered. Matthew Arnold died in the first seizure, while John Hunter lived twenty years with almost daily paroxysms near the end. Marked disease of the aorta and aortic valves means death in a limited period. Myocardial changes are unfavorable. Angina minor may exist for years or even disappear altogether. Cases are reported existing for thirty or forty years with final cessation of attacks. An elderly lady in this city had marked attacks years ago which have nearly disappeared.

The French have reported sudden deaths in young soldiers from syphilitic aortitis (shown by necropsy) with angina "sine dolore." In no disease is death so instantaneous. The vagus, stung by the anginal pain acting on a diseased structure, acts with appalling swiftness. A poet thus describes the death of his mother from angina.:

"One moment here, the next she trod  
The viewless mansions of her God."

*Treatment:*—Says Dr. Latham, "Medicine is a strange mixture of speculation and action; we cultivate a science and exercise an art." Every person with attacks of angina, no matter from what cause, must give up tea, coffee, tobacco, and alcohol. He must avoid violent exercise, excess of diet, and mental emotion. If the blood pressure be excessive, that must have systematic treatment.

In no other malady is gentle intelligent care and nursing more indicated. As one author remarked, often such dangerous remedies are employed and to such excess as to resemble the storming of a mud hut with Armstrong guns.

The study of focal infections has been of great importance in these cases; also a full knowledge of the circulatory conditions.

In some patients a postprandial rest, even moving the person from the dining table in a wheeled chair has averted attacks, while the establishing of a cheerful psychic attitude often gives comfort and relief. Graduated exercises

and Nauheim baths have given me good results in some cases.

Rest in a sanatorium may reduce the size of the aorta by one-fifth of its diameter in high pressure cases. The meals should be spare and frequent. Heavy meals or banquets at night are an abomination for such persons.

The Karell cure is recommended occasionally if the heart is in fairly good condition.

The nitrites are among our most valuable remedies and usually nitro-glycerine is by far the most reliable. It should be a fresh preparation and given in 1/100 grain doses dissolved under the tongue. It is usually given in too small doses and then abandoned as useless. Increase the dose until relief even if headache, dizziness or flushing of the face be marked. Twenty to fifty tablets have been given daily with beneficial results. I direct my patients to get an original package of 100 tablets and renew them every few weeks as the tablets deteriorate rapidly. If the pain is very severe, morphine or morphine with atropine is the sovereign remedy. One-eighth to 1/4 grain is usually insufficient and a small repeated dose is not so adequate as a large single one. Chloroform is dangerous as we do not know the exact condition of the heart muscles.

Sodium iodide is usually beneficial, probably on account of the frequency of syphilis. Some administer it continuously in all cases.

Mercury in specific aortitis has often a wonderful effect and no better form than the inunction has ever been used.

Dr. McKenzie claims that bromides are of great service where marked nervous symptoms exist.

Atropine protects the heart against inhibition shock and is used in doses of 1/100 grain three times a day.

Theobromine apparently lowers the blood pressure in high tension cases. Strychnine phosphate 1/50 grain three times daily has apparently aided some of my cardiac cases.

Digitalis is contraindicated where the heart is fairly sound. It may be needed for some concurrent cardiac disease. In a defeated heart where the drug does not bring the usual response, it may be dangerous. High frequency



current is said to give temporary benefit in mild angina cases with high pressure.

For the flatulence, nothing can compare with essence of peppermint or better, old whiskey in hot water.—“Though lost to sight to memory dear.”

Phlebotomy was of assistance in one of my very plethoric cases.

In conclusion, the Epicurean philosophy holds true with us as with other individuals. We know what we are and we know not what we may be. We want to cling to this wicked old world as long as we can.

“But comes he slow or comes he fast,

It is but death that comes at last.”

If these desultory remarks will aid at some future time to the slightest degree in warding off this cruel affliction from one of you or by your instrumentality from one of your patients, these moments will not be consumed in vain.

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## SURGERY OF THE URETER\*

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Surgical procedures for the relief of diseases of the ureter are very common and are carried out very satisfactorily. More progress has been made in this field of surgery than in almost any other in the past decade, largely by the developments in cystoscopy and roentgenology, as well as by a better knowledge of the renal function and the relation of the ureter to the kidney and bladder. Furthermore, very distinct improvements in the technic of the operations have been made.

Normally, the ureter which joins the kidney pelvis and the bladder lies loosely in the fatty tissue in close proximity to the peritoneum and on the anterior surface of the large spinal muscles, although it is more closely associated with the peritoneum. When the peritoneum is reflected from its posterior attachments, the ureter invariably is carried with it. Attention to the close association between the ureter and the peritoneum is a useful guide during operation. In spite of this, ordinarily it is preferable to carry out operations for lesions of the ureter entirely

as extraperitoneal procedures. Under unusual circumstances it may seem best to make the approach through the peritoneum, or at times the peritoneum may be accidentally opened in exposing the ureter. In this event, if the opening in the peritoneum is carefully closed, no harm will result. The extraperitoneal exposure is just as easily made. There is less danger from infection, and drainage, when it is necessary, is more easily established.

The several different lesions of the ureter which require surgical treatment may be classified into groups according to the etiology. These lesions may be the result of (1) a congenital anomaly, (2) trauma, (3) inflammation (ureteritis and stricture), (4) calculi, and (5) tumors (primary and secondary).

*Congenital Anomalies.*—Congenital anomalies of the ureters are common, although only a small number produce symptoms or require treatment. The ureters often are double on one or both sides, and while the condition may not result in trouble and frequently is not known, I have seen a few cases in which, as a result of the deformity, there seemed to be an intermittent obstruction to one or both ureters causing infection and destruction of the kidneys.

Intermittent hydronephrosis is occasionally encountered in very young persons and suggests that the obstruction which occurs at the ureteropelvic juncture may be due to some irregularity in the development of the parts. The etiology of this form of hydronephrosis, which occurs at any age, is not well understood; it may be that some phase of the development is at fault. At times anomalous vessels seem to be a factor, but often even a microscopic examination of the tissues in the strictured area is negative and apparently the lumen of the ureter is patent most of the time. Recently I operated on a boy six years of age who had had severe renal attacks for three years. The hydronephrosis could be felt as a large tumor during each attack. During the later attacks his ureter had been catheterized without difficulty and with complete and immediate relief. A large hydronephrotic sac, a partially destroyed kidney, and a normal ureter below the juncture with the kidney pelvis, were found. I removed a part of the normal ureter with the kidney, but no cause for the condition could be demonstrated. Plastic op-

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erations for the relief of such conditions have not, as a rule, been satisfactory.

A number of years ago I reported several interesting cases of extravescial opening of the lower end of the ureter. Since then I have seen a few such cases, but the condition is not common. It may occur when there is a single ureter from each kidney or when there are four ureters, two on each side. When the patient has only two ureters, one of them usually opens into the bladder closer to the urethra than the normal position, and the trigone is irregular. In our cases the opposite ureter opened into the urethra outside the sphincter or into the vagina. In a case in which there were four ureters, two on one side and one on the other side, proved to be normal; the fourth opened into the vagina. The clinical features of these cases were characteristic. The condition had existed since birth and was discovered in infancy or childhood. A part of the urinary output passed into the bladder and was voided under the control of the sphincter, while that coming from the extravescial ureter dribbled continually. As a result there were both incontinence and normal voiding, which also is a characteristic feature. It is often difficult to locate the extravescial opening when the condition is suspected, although this can usually be accomplished by administering methylene blue and placing small pledgets of cotton into the urethra and vagina where these openings are most frequent. In such cases I have ligated the extravescial ureter with complete success and have also transplanted these ureters into the bladder satisfactorily.

*Trauma to the Ureter.*—The ureter may occasionally be traumatized by a fall or by external injury, although this is uncommon. I have operated on one patient in whom the ureter was completely severed from the pelvis of the kidney as the result of a slight fall. In a few other instances the ureter was found completely severed by an injury which ruptured the kidney itself. Most injuries to the ureter, which we are called on to treat, result from trauma during an operation or at childbirth; but such cases are not seen so frequently now as formerly when complete hysterectomy with removal of pelvic fascia was a common procedure in cases of carcinoma of the cervix. The ureter is occasionally injured during abdominal and vaginal pelvic

operations, rarely during operations on the colon. Experience has taught us how to avoid the ureter during such operations, although I am inclined to believe that the ureter was ligated more often than we realized during the performance of hysterectomies, for now and then a patient is seen on whom a hysterectomy was performed some years ago who has an impassable stricture just at the point where a ligature on the uterine vessels might include the ureter. So long as the kidney and ureter on the opposite side functionate normally there will be no clinical manifestations due to the sudden complete closure of the ureter. It has been shown that if the ligation is discovered within fourteen or fifteen days and the ligature removed, the kidney and ureter will resume normal function. We have extensive experimental and clinical evidence to show that the kidney which is unable to function, because of ligation of the ureter or of occlusion, will begin functioning quite rapidly on removal of the obstruction, even though the obstruction has existed for some time. Recovery eventually will be complete.

*Inflammations.*—Inflammations in the ureter alone are not very common, although ureteritis is often seen in conjunction with infections in the kidney. Independent inflammations in the ureter may occur in the form of stricture or the process may involve the greater portion of the ureter. Much has been said in the past few years regarding stricture of the ureter, and some observers believe that the lesion is common, occurring secondary to a distant focus of infection. In such cases patients are usually relieved by the passage of a small sound up the ureter to dilate the stricture. In our experience this lesion does not occur so often as it has been reported to occur. A true stricture of the ureter requiring operation for relief is not common, although it does occur and we have in a few instances performed plastic operations for the relief of the condition.

Diffuse ureteritis may occur independently and may be bilateral. The inflammation gradually destroys the entire lumen of the ureter. I have performed plastic operations and attempted to drain the inflamed tissue of the ureter. In one case, this was of no avail so that finally I followed the technic of Marion of suturing the kidney to the muscles as superficially as possible



and passed a small trocar through the cortex of the kidney into the pelvis and then introduced a rubber catheter into this opening. The opposite kidney had been removed some years before for the same condition. During the fifteen months since operation the patient's entire urinary output has passed through the tube in the remaining kidney. He has been able to carry on his work and is very comfortable. At the time of operation the kidney seemed fairly normal with the exception of a slight hydronephrosis.

Ureteritis is often associated with infections in the kidney and it is questionable whether the ureter should be removed since the procedure constitutes an added risk by exposing more tissue to infection.

In cases of hydro-ureter and hydronephrosis, the result of stone in the ureter, it is preferable to remove the ureter, at a second stage if necessary, as well as the kidney. If there is pyonephrosis I do not believe that it is necessary, as a rule, to remove the ureter with the kidney. Often it is almost completely destroyed and will seldom cause trouble if not removed.

In cases of tuberculosis of the kidney, ureteritis is one of the outstanding features, and the changes in the ureter usually are more evident grossly than those in the kidney. The swollen and edematous ureter extends up to and involves the bladder wall, producing the reddened and congested meatus which aids the cystoscopist in diagnosing the condition. Such ureteritis is largely a round-cell infiltration; there are very few tubercles in the tissue; often none can be found. In these cases secondary tuberculosis in a large wound, such as is required to remove both the kidney and the ureter, is a serious matter. In view of these facts and in view of the fact that the results are very good if the ureter is not removed, even though it is isolated, it seems to me that as a general rule the ureter should not be removed at the time of nephrectomy for tuberculosis of the kidney.

*Calculi.*—Probably the most common operation on the ureter is for the removal of impacted stones. Stones which form in the kidney often become lodged in the ureter and, in most instances, are found in the lower third of the ureter, close to the ureterovesical juncture. Un-

doubtedly most of these stones pass spontaneously, although a great many require treatment. If the stone in the ureter is not causing pain and is not obstructing the ureter, I see no reason why we should not wait to see if it will pass of its own accord. If it is causing trouble it should be removed, preferably by dilating the ureter and thus permitting the stone to pass on into the bladder, a procedure which can be carried out very satisfactorily in most instances. It is not well, however, to persist in dilating when nothing is being accomplished, and especially if there is intolerance to the cystoscope accompanied by reaction following the manipulation. Few surgical procedures have proved more satisfactory than the dilatation of the ureter for the removal of stones, but the open operation should always be performed if there is any contra-indication to the intravesical method.

*Tumors.*—Primary tumors of the ureter are rare. A few cases of cystic tumors and a few of papillary tumors have been reported as occurring primarily in the ureter. I have operated in one case for papillary tumor of the lower end of the ureter which will be reported shortly. The patient was a man aged 48 who gave a history of passing bloody urine at intervals for two years and without much change in his condition during this period. The lesion was diagnosed correctly at the time of cystoscopy, although it could not be demonstrated whether the tumor was primarily of the ureter or secondary to one in the kidney pelvis. Just before coming for consultation the patient had had an acute illness apparently from a pyonephrosis, and at operation we found that his kidney contained much pus and that the infection had extended into the peritoneal tissues. On this account we divided the operation into two stages, removing only the kidney at the first stage. After ten days the entire ureter and a segment of the bladder were removed. The neoplasm was confined to the lower end of the ureter. Although the kidney was partly destroyed, the destruction seemed to be due to infection; there was no evidence of neoplasm. No doubt this is a case of primary papilloma of the ureter.

Secondary tumors of the ureter are not so uncommon and usually occur with papilloma of the renal pelvis. We have seen a number of

these cases, and in each instance sooner or later papilloma occurred in the ureter, usually just above the bladder. I believe that the entire ureter should always be removed if there is a papilloma in the pelvis of the kidney. In some cases it may be best to operate in two stages, but the patient should not be dismissed until the ureter and ureterovesical area of the bladder have been removed. In two fairly early cases of renal papilloma we simply removed the upper third of the ureter at the time of the operation: in each instance there was a recurrence in the lower end, necessitating removal of the remaining portion of the ureter at a time when the chances for permanent cure were not so good. Such tumors are prone to recur in the bladder so that in all cases of papilloma of the pelvis of the kidney and of the ureter, the patient should undergo cystoscopic examinations at intervals after operation the same as a patient who has been operated on for tumor of the bladder. When papillomas of the bladder are diagnosed it should be borne in mind that the primary tumor may be in the kidney or ureter, and if feasible a more complete examination of the kidney and ureter should be made. In one case we destroyed the papilloma of the bladder by fulguration first, believing that it was the only lesion. The hematuria continued and we soon discovered that the primary lesion was in the pelvis of the kidney and that the tumor in the bladder was secondary.

In case the ureter has been traumatized during a pelvic operation or during an operation on the colon, if possible it should be repaired at once. End-to-end suture will be satisfactory in some cases. In one instance, after I had severed the ureter during a pelvic operation, I made an end-to-end anastomosis and wrapped the ureter with a cuff of peritoneum. There was a slight urinary leakage for a time, but this stopped in about two weeks, and eighteen months later we were able to pass a ureteral catheter, although there was some tendency to stricture. An end-to-side anastomosis has been made satisfactorily in some cases. If the injury is low I believe that it would be best to reimplant the ureter into the bladder. These operations have been satisfactory when employed for other conditions. We have followed the course of many of our pa-

tients with transplanted ureters for several years and have catheterized the ureters and made pyelograms four and five years afterward. The kidney function has remained normal after the ureter was transplanted. In a few cases strictures have formed at the point of anastomosis to the bladder. If a plastic operation cannot be carried out and if it is impossible to transplant the ureter there need be no hesitancy in ligating the ureter with a permanent ligature, and in all probability it will not be necessary to remove the kidney or to do anything further. This method, of course, destroys the kidney and should never be employed when any other means can be employed. It is also imperative to know that the opposite kidney is able to carry on the renal function. This procedure is often indicated when a part of the colon and several inches of the involved ureter are removed, and in cases of resection of the bladder for malignant tumor involving the lower end of the ureter. In such cases it is much better to ligate the ureter than to transplant it into the colon.

The blood supply to the ureter comes from two branches, from the renal vessels especially. There are also some small branches from the internal spermatic and vesical arteries. When we have been called on to remove the ureter, as in cases of neoplasm, the kidney also has been removed so that the vessels at the upper end have been ligated.

The entire ureter can be stripped from its surrounding tissue, usually without difficulty, and when the lower end is dissected out it brings this area of the bladder with it so that the entire ureter and quadrant of the bladder can be excised readily. If the kidney and ureter are both to be removed at the one operation it is usually best to remove the kidney first through a posterior lateral incision, and then free the lower end of the ureter and close the bladder through a separate anterior incision and remove the kidney and ureter in one piece. If the operation is to be performed in two stages, the kidney is removed first and later the ureter excised through a straight anterior incision through the rectus muscle.

*Operations.*—The most common operation on the ureter is the removal of stones. Stones are most often lodged in the lower third of the



ureter and often very close to the ureterovesical juncture, and sometimes in the part of the ureter within the wall of the bladder. Within the past few years methods have been devised for safely dilating the lower end of the ureter and allowing stones in this location to pass. This technic is now carried out so successfully that it must be considered the treatment of choice in the majority of cases of stone in the lower third of the ureter. In certain cases in which there is a great deal of infection, or in which the stone is very large, or in case the patient does not bear the cystoscopic examination well it is still preferable to perform the open operation for stones in the lower part of the ureter. If the stone is in the middle or upper third of the ureter I believe that it is usually best to remove it by operating. The results of operations for the removal of stones have been very satisfactory since we have developed a definite technic readily to expose the ureter and the stone and the operation can be completed without undue trauma. After the calculus has been removed through as small an incision in the ureter as possible it is often advisable to put in one or two fine catgut stitches loosely to close the opening. I have followed this plan in a great many cases and usually have succeeded in preventing urine from draining; apparently this has not caused trouble in any case. Care should be taken to prevent any tendency to stricture of the ureter by sutures.

#### DISCUSSION

DR. WARREN A. DENNIS, St. Paul: It is rather difficult to discuss a subject of this magnitude in the time allotted for discussion. Dr. Judd's paper is a most excellent one. It has covered a great deal of ground and there is little or nothing to disagree with. However, I would like to mention a few experiences in this line of work.

My first case of anomaly of the ureter occurred many years ago, before the days of the modern cystoscope, and had a tragic ending. A young woman of 28 who had had a nephropexy of the right kidney, still complained of severe pain in that region, with some pus in the urine and continuous slight fever. No tubercle bacilli could be demonstrated. Examination with the Kelly cystoscope showed two ureters entering the bladder in the normal location. Nephrectomy was done and later it was discovered that the kidney, although normal in contour, contained two pelves and therefore represented the only kidney structure. The ureter from the upper pelvis

crossed the midline behind the bowel and in front of the great vessels and opened normally into the bladder. Previous operation on the kidney, and dense adhesions following, account for the failure in recognition of the true pathology.

Another case of double ureter was operated upon five or six years ago. In this instance a woman of about 50 presented a tumor in the right lumbar region a few centimeters below the kidney and about the size and shape of the kidney. Two ureters passed over the surface of the tumor, both slightly encroaching on the substance of the tumor. Inasmuch as the urine was normal the one ureter was tied off and removed and the other one resected and an end to end anastomosis done. She returned a few months later with a tumor in the right lumbar region. I supposed she had a recurrence of the tumor which had proved to be a spindle cell sarcoma. She was unwilling to have a cystoscopic examination made at the time and afterwards went to Rochester where the kidney was removed by Doctor Mayo. There had been no recurrence of the sarcoma but the tumor was an enlarged kidney caused by a stricture at the site of the anastomosis. The operation done was practically that recommended by Peterson, who believes the end to end method to be the best, the lower end of the upper segment being invaginated into the upper end of the lower segment, the latter being slit down slightly on one side and the excess of mucous membrane removed. No sutures should pierce the cavity of the ureter since it is extremely desirous to avoid round cell infiltration, such infiltration being likely to result in scar tissue and stricture.

In speaking of stricture of the ureter I presume Dr. Judd refers to the work of Hunner, who believes that it is many times more frequent than stone, in fact that stone is in a large percentage of cases the result of stricture. Stricture of the ureter Hunner believes to follow inflammation due to focal infection in some other part of the body. This may very well be true and certainly in a routine use of the ureteral catheter one not infrequently runs across distinct narrowings of the ureter. Stricture of moderate caliber is undoubtedly one of the causes of hydronephrosis and we know that with interference with drainage infection of the kidney is much more likely. It seems probable that there is much truth in Hunner's contention.

As Dr. Judd has pointed out, in cases of stone in the ureter it is wise to allow a considerable period of time to elapse in order that nature may, if possible, pass the stone without interference, and we know that in a large percentage of cases she is able to do this. However, in the presence of marked obstruction or inflammation or attacks of pain, no great amount of time should be lost.

The operation of choice is the extraperitoneal rout through the rectus muscle and can ordinarily be accomplished without much trouble. However, in case there has been inflammation about a stone lo-

cated in the lower ureter, exposure of the field may be extremely difficult as I have discovered from experience. In one case of this kind a stone was felt after the ureter had been opened and was believed to have been pushed downward into the bladder with the probe. Later X-ray examination showed that it had been moved forward about one inch but was still in the ureter. A short time later, following an attack of ureteral colic, the X-ray showed the stone had disappeared. Nature could hardly be expected to be so kind in every case of that character.

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## THE PHYSIOLOGICAL BASIS AND CLINICAL APPLICATION OF BASAL METABOLISM\*

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Let us first consider—what is metabolism? Metabolism has been defined as the basis of life and all its phenomena. Where there is life there is metabolism and even after death it continues for a short period of time. It exists in the protoplasm as well as in the body as a whole, the cell being the origin of energy, the seat of chemical change, of growth and of function. The digestion and assimilation of nutriment, reproduction, growth, inflammation, degeneration, regeneration, exercise of function, motion and emotions are all matters of chemistry but species, genus and periods of existence are determined by heredity, while size, weight and personal appearance are matters of metabolism. The regulating of metabolism is done by the endocrine glands or the glands of internal secretion. By the term basal metabolism of an organism is meant the minimal heat production of that organism measured from 12 to 18 hours after the ingestion of food and with the organism at complete muscular rest. This may be determined by actual measurement directly in a calorimeter or else indirectly by analysis of the end products which result from oxidation within the organism, that is, the amount of oxygen absorbed and amount of carbon dioxide given off in this process of combustion; also measuring the amount of nitrogen eliminated in the urine and feces. It has also been shown by many workers that the basal metabolic rate is found to bear a

constant relation to the surface areas, the rate thereby becoming mathematically a function of the body surface.

The first experiment in the metabolism was done by Lavoisier, in 1780. He identified and named the gases of combustion and understood and described very clearly the problem of animal combustion both qualitatively and quantitatively. Very important work was next done by Carl Voit and his pupils the chief of whom were Pettenkofer and Rubner. Rubner determined heat values of carbohydrates and fat first, and later that of proteins. These were absolutely necessary before the method of indirect calorimetry could be employed in order to calculate the heat derived from their combustion in the body.

The story of the development of calorimetry from this time to the present day is a very interesting one, but will not be included in the scope of this paper. Suffice it to say that it includes the names of prominent men in the history of recent experimental work in clinical and physiological medicine, among them Atwater of Wesley University and Benedict of the same institution, Lusk and Williams of Cornell Medical College, Eugene Dubois of the Russell Sage Institution of Pathology and his brother, D. Dubois, Krogh of Copenhagen and Carpenter of Carnegie Nutrition Laboratory. These are the pioneers in its development.

The development of indirect calorimetry is to be credited mostly to Benedict who devised the first respiratory apparatus for determining the basal metabolism by this method. A great amount of experimental work showed that the indirect method checked within a very small percentage of the direct method of calorimetry. Benedict and his associates, also Lusk and Dubois and their co-workers, have likewise demonstrated in a large series of normal and pathological conditions the close agreement between the two methods. As a result of these investigations the use of such a complicated apparatus as a respiratory calorimeter has been shown to be unnecessary for clinical work and that in its place a comparatively simple method of indirect calorimetry may be used and that in the majority of cases it is really more accurate than the more complicated apparatus. This simple method is the one used at our Clinic.

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Our tank has been modeled after the gasometer introduced by Tissot in 1904. A simple description of our method is as follows: A mask is adjusted over the patient's mouth and nose. By means of expiratory and inspiratory valves the total volume of the patient's expired air is collected in the gasometer for a known period of approximately 10 minutes. Duplicate determinations are made of the carbon dioxide and oxygen content of the expired air, the analysis being done in the Haldane gas analysis apparatus. Hence the ventilation rate for each minute is known as well as the amount of carbon dioxide produced and the oxygen absorbed, and it is possible to calculate by means of a caloric table the total number of calories produced each hour.

The respiratory quotient, that is, the ratio being burned in the body. Any substance when consumed demands a certain amount of oxygen in the process of combustion; that is, the ratio of carbon dioxide over oxygen is constant for any substance. The more highly oxidized a substance is at the start, the less oxygen it needs to complete oxidation; hence, the higher will be the respiratory quotient. We know the respiratory quotient for fats, proteins, and carbohydrates, these having been determined, and we also know the heats of combustion for various foods and, since they give the same amount of heat in the body as in a retort, it has been possible to calculate the value in calories of a liter of oxygen for any respiratory quotient between .7 and .1. Thus, if we know the respiratory quotient and oxygen absorbed we can calculate the heat production by this formula: Oxygen absorbed per hour multiplied by the caloric value of the oxygen formed for any definite respiratory quotient, equals the calories per hour. The total number of calories must, however, be divided by the surface area, a factor depending on the patient's height and weight. F. Dubois and D. Dubois have shown that there is a direct relation between the basal metabolism and the surface area of the patient with regard to age; and further, that the basal metabolism of normal persons can be predicted accurately to plus or minus 10 per cent, in conjunction with their standards of normal basal metabolism, by means of the surface

area. They have given us a formula and chart by which the surface area can be easily calculated in any individual where the weight and height of the patient are known. This fact has been confirmed by Means and Boothby. Thus we are able to determine the basal metabolism in a practical and easily applicable manner and with an accuracy of within 1 per cent as has been shown at the Mayo Clinic where over 12,000 tests have been done.

The basal metabolic rate is of the greatest value in the thyroid disorders, in their diagnosis as well as their treatment. Frederick Buehler, in 1893, first pointed out the increase in metabolism in exophthalmic goiter by showing that the patient lost weight and nitrogenous substances on a diet that was more than sufficient to cover the needs of a normal person. Magnus-Levy two years later was the first to demonstrate the increase in the respiratory metabolism in hyperthyroidism and the decrease in myxoedema. Since then he has studied many cases of both diseases and used the respiratory metabolism as index of the effects of treatment thus demonstrating the increase in heat production following the administration of thyroid extract.

In exophthalmic goiter the metabolic rate may rise well over 100 per cent above normal while in myxedema with apparent complete cessation of thyroid activity the rate falls to a region of 40 per cent below normal. In the milder cases of both groups the metabolic rate variations from the normal are proportionally smaller. This has been the conclusion arrived at by a great many men who have done experimental work along this line. Boothby and Sandiford of the Mayo Clinic under the direction of Plummer report 549 patients with thyroid disorder on whom 1143 metabolic rates were determined. In 182 cases of exophthalmic goiter before any treatment was instituted the average metabolic rate was plus 51 per cent and the average pulse rate 115. After rest in bed it was definitely shown in each case that not only the pulse rate went down but the metabolic rate also was found to be decreased.

Snell, Ford and Rountree have shown in a small series comprising 13 cases which were all typical clinically of exophthalmic goiter, the

basal metabolic rate ranging from 22-82 per cent plus, the rate being approximately proportionate to the clinical evidence of thyroid intoxication. Two patients of this series died. The patient with the higher rate, plus 82 per cent, died within a month after ligation; the second patient, plus 56 per cent, did not come to operation but died of influenza and apoplexy. In another series of 11 cases of thyrotoxic-adenoma the metabolic rate ranged from 10-45 per cent plus. After surgical treatment the majority of these cases showed a decrease in the metabolic rate as well as in the symptoms. They conclude their work with the statement that the basal rate furnishes an accurate index to the results of medical and surgical treatment of conditions of the thyroid gland and thereby becomes of value as a guide in the treatment as well as an index to the severity of the disease.

G. F. Dubois of New York in his fourteenth paper, entitled "Metabolism in Exophthalmic Goiter", introduces it as follows: "To those who are accustomed to think in terms of the energy requirement, exophthalmic goiter stands out par excellence as the disease of increased metabolism, and the increased metabolism stands out as the chief symptom of hyperthyroidism. The determination of the heat production seems to afford the best index of the severity and course of the disease." He further states that he has found an increased basal metabolism with great regularity in exophthalmic goiter and, on the other hand, in Cretinism and myxedema, the metabolism is lower than in any other disease. He concludes that all diseases in which metabolism is increased are easily distinguishable from exophthalmic goiter and they never approach the extremes found in this condition and the measurement of the heat production, that is, the basal metabolism, gives us the best index of the severity of the disease and the effect of the treatment. Very severe cases show an increase of 75 per cent or more above the normal, severe cases, 50 per cent or more and mildly severe and mild cases, less than 50 per cent.

The question of metabolism in exophthalmic goiter has been reviewed by Magnus-Levy, Hurst and Falta. Schultz has given a large number of references on the subject of Cretinism.

Janney and Henderson, in their recent paper on hyperthyroidism, state that the basal metabolic rate determination has the advantage of being entirely objective and is thus peculiarly applicable to border line cases.

Magnus-Levy, Dubois, Means and Aub have also found this method the best laboratory aid to diagnosis of thyroid conditions we now possess.

Let us now compare the value of basal metabolism determinations in thyroid disorders and some of the other simpler objective tests. In reality no one of the objective tests taken gives an accurate idea of the course of the disease but when a number are taken together and added to the clinical impressions of the observer they afford a rough measure of the severity of the disease.

The rapidity of the heart action is perhaps the best guide but the heart is also affected by other conditions and damage to the heart may outlast the other symptoms. Sturgis and Tompkins of Boston in a study of 496 basal metabolisms found that the pulse rate varied directly with the metabolic rate; in other words, an extreme degree of tachycardia suggests a greatly increased metabolism while a slight tachycardia indicates a moderate degree.

Again, rise in temperature is so irregular as to preclude its use as a reliable index. Changes in the size of the gland do not parallel the course of the disease; changes in weight, warmth of skin and sweating are but indications of the increase in heat production. Eye symptoms, tremor, nervousness, irritability, weakness, diarrhea are all too variable to be relied on and are too difficult to measure accurately. The blood pressure is of some use as a guide but is affected by the age and by the condition of the cardiovascular system. Janney and Henderson have shown that the sugar-tolerance test depends on other ductless glands as well as the thyroid and even in itself has wide limits. The mononucleosis which has been considered characteristic by Koker, Halsted and others is found in other diseases and does not seem significant enough to be our main reliance. The Goetsch adrenalin test has been found to vary considerably and is also merely a qualitative rather than a quantitative test. Sandiford of the Mayo Clinic could dem-



onstrate no relation between the intensity of the epinephrin reaction and the degree of hyperthyroidism. Marine and Lenhart of Western Reserve University Medical School have confirmed these findings in experiments on animals. Peabody and his associates report that hypersensitiveness to epinephrin is found in patients who have no indication of hyperthyroidism and that the fundamental nature of the reaction in the Goetsch adrenalin test is unknown but it probably only indicates a hypersensitiveness of the sympathetic nervous system and should certainly not be regarded as having any specific significance in the diagnosis of hyperthyroidism.

Basal metabolism determinations are also of value in hypothyroidism as well as in hyperthyroidism. Magnus-Levy found that in myxedema the rise in heat production began in the first week of the administration of thyroid extract and increased gradually to the fourth and fifth week. The effect was most pronounced in severe cases, causing a rise from 15 to 70 per cent. In mild cases the increase was slight never going above 12 per cent. In five out of nine normal controls there was no rise at all.

Von Borgen and Means found a marked rising metabolism after thyroid administration in myxedema.

Eugene F. Dubois, using a calorimeter, found the basal metabolism in a case of a cretin to be 20 per cent below the normal. Snell, Rountree and Ford in a series of thirteen cases of cretinism and myxoedema, investigated from the standpoint of basal metabolism, found the metabolic rate varied from -7 to -25 per cent and that there was a prompt rise after the intravenous injection of thyroxin. Plummer of Rochester corroborated these findings by his own experiments especially as to the rapid increase in the metabolic rate following the intravenous injection of thyrotoxin. It is interesting to note that when the thyrotoxin was given by mouth, the rise was very much slower and less marked.

Janney and Henderson, previously referred to, after a series of experiments concluded that latent hypothyroidism is more frequent than is generally supposed and found the basal metabolic test most valuable in diagnosing this condition. As among eighteen consecutive thyroid

cases this condition was present in twelve, four cases being dysthyroidism and only one presenting classical myxedematous symptoms. At our Clinic, out of twenty-seven consecutive thyroid cases, eight proved to be hypothyroidism.

Thus, if a case gives a history of obesity particularly in early life, mental symptoms, marked liability to contract infection, hair anomalies, dry, hard skin with pigmentation and atrophy, cold extremities and cold skin generally, obesity, decreased size of thyroid and subnormal temperature, pulse and respiration, a metabolic test may help us to arrive at a diagnosis of hypothyroidism.

We have found it very helpful at our Clinic in diagnosing the border line cases especially those showing some of the above symptoms.

In the treatment of hyperthyroidism, mental and physical rest is the surest means of securing a drop in the metabolic rate which indicates a diminution of the activity of the thyroid. Ligation of the arteries of the thyroid, as shown by E. F. Dubois, usually causes a distinct rise in heat production which may last for several weeks. Thus, following a ligation of the arteries the patient should be kept as quiet as possible and thyroid extract should on no account be given. He also showed that various drugs including the serum of thyroidectomized animals the roentgen ray and Beebe serum have had little effect in decreasing the metabolism or the toxicity of the disease. Means and Aub, however, in their publications have shown where a distinct value has been obtained by the roentgen ray in the treatment of toxic thyroid with a marked decrease in the metabolic rate after its use. Rountree gives one case where it has been used with the same effect. We have used it on 2 cases considered too toxic to operate. The clinical symptoms and the basal metabolic rate in both cases returned to normal after four or five treatments during a period of six months. However, there are great opportunities open here for experimentation and yet no definite conclusions can be drawn.

Before closing the subject of the value of basal metabolism in thyroid study let us remember as Janney Henderson has shown that in the interpretation of basal metabolic studies it must, however, be borne in mind that, in such, merely

the total requirements for oxygen and carbon-dioxide production of the body at a given time are so measured. Though increase in the metabolic rate is at present the most exact laboratory aid in determining of the thyroid function, this method merely measured the degree of utilization or production of two essentially end products of metabolism. The fact that blood glucose and basal metabolism determinations do not coincide in thyroid cases indicates possibly that the metabolic disturbance in thyroid disease is more complicated than the metabolic rate would indicate. It is probable that the metabolic rate merely shows the end result of the inter-activity of the endocrine glands, the most important of which is probably the thyroid.

Let us next consider the basal metabolism in pernicious anemia. The majority of investigators, including Finkler, Lukjanow, Pembrey, Gurber, Delchef and many others, have found an increase in the basal metabolic rate. This held true with the leukemias and chlorosis as well. Magnus-Levy, Pettenkoffer and Voit found an increase in metabolism in leukemia patients. A. L. Meyers and Dubois in a study of five cases of pernicious anemia found an increase of metabolism in all cases, the figures varying from 2 to 33 per cent above the average normal. They found the basal metabolism of pernicious anemia to be lower than that of leukemia but as a rule higher than that of secondary anemia. They also think that there is some ground for the belief that the height of the metabolism is a measure of the severity of the clinical picture.

In three of our cases we found the metabolism to be 10 to 20 per cent plus when the hemoglobin was low, while it varied from normal to 20 per cent during the remissions.

Tompkins of Boston found after transfusion the metabolism always reached the normal or diminished level. Remembering that transfusion causes a diminution of pulse rate and respiratory activity and a drop in temperature, which has been previously elevated, the lowering of the metabolism is probably due mostly to a decrease in the muscular activity in the anemic individual although this is not entirely true as the response of metabolism to transfusion lags

behind that of all the other factors by an interval of several days.

The study of metabolism in diabetes is still in its infancy. Many experiments have been done by various men all indicating at least a normal or slight increase in the basal metabolism but this is not the significant thing as it is very difficult to calculate the accurate base of metabolism in diabetes because at present we have not a satisfactory standard between diabetic and non diabetic patients. The most value of basal metabolism in diabetes is what it tells us about the oxidation processes going on in the body in varying cases of severity, and the effects of various diets. Allen and Dubois have clearly shown that the old von Norden idea of treatment is erroneous and that there is no special influence of oatmeal in diabetes or special readiness of oxidation of this form of carbohydrate.

The level of metabolism in diabetes is a resultant of a number of forces; for example, increased destruction of proteins and perhaps other processes, tend to increase metabolism and undernutrition, muscular relaxation and other possible conditions tend to diminish metabolism. So the actual metabolic rate is not so important for it depends which one of these groups predominates, as to whether a higher or lower metabolism will be obtained in any individual case of diabetes. There are still great possibilities for experimental metabolic work in this disease but metabolism already has been shown to be the key to oxidative processes occurring in the body and an aid in the dietary therapeutics and possibly even an index to the severity of the disease.

Basal metabolism in diseases of the pituitary glands has been studied very little. Snell, Ford and Rountree in a series of seven cases found that it varied between -10 and + 30 but after treatment with pituitary extract there was a tendency for the metabolism to reach the normal level. Means has also done some work along this line.

The literature contains extremely few reports on observations of metabolism of patients with heart disease. Work has been done by Kraus, Grafe and more recently by Peabody, Meyer and Dubois. Their results show that the metabolic rate in itself is not so important but a study of



the respiratory quotients obtained may give us an insight as to the possible causes of acidosis or dyspnea in these cases.

McKann and Barr of New York have made an extended study of basal metabolism in tuberculosis. They agree with previous investigators including Kraus, Chvostek, Speck, Robin, Binnet and Stashelin that the specific dynamic acting of protein in tuberculosis is very important in the treatment of the condition. They have noticed that a rise of metabolism occurs in cases of tuberculous patients after ingestion of large amounts of proteins. The importance of rest during periods of activity in pulmonary tuberculosis has been generally recognized in artificial pneumothorax, rest in bed, and control of the cough, the volume of the respiratory exchange and the total ventilation being thus reduced. This seems to be a desirable end for which we strive during the period of encapsulation of the foci of the disease. It does not seem to have occurred to the practitioner that an increase in metabolism due to the specific dynamic action of protein will have the same effect on the respiratory exchange as a similar increase due to muscular work.

Thus, during periods of acute activity of the disease it may be well to limit the protein intake and the total calories fed to patients to the minimum necessary to maintain nitrogen equilibrium without regard to the weight of the patient. Later, when acute symptoms have subsided, and when there is evidence that the natural barriers against the disease are established a more general diet could be given with less fear of the effects of an increased respiratory activity.

This is verified by Janney and Newel in the relationship of tuberculosis and diabetes. These authors point out that the course of pulmonary tuberculosis complicating diabetes does not seem to be influenced unfavorably by the state of undernutrition resulting from a rigid adherence to the proper diabetic diets but quite the reverse.

Coleman and Dubois found very little specific dynamic action of protein in febrile typhoid patients. Kocher has varified their results.

This data, although small, will serve as a starting point for work of a similar nature which should be done in all febrile conditions where dietary therapeutics are important.

#### SUMMARY

1. Determination of the basal metabolic rate is based on sound physiological principles and is the best index we have to the combustion going on in the body in various pathological conditions. The method of indirect calorimetry as described is not only practical but is accurate.

2. Determination of the basal metabolic rate is the most valuable single test that we have at present to measure the severity of the disease in exophthalmic goiter, but must always be taken into consideration with the clinical history and general aspects of the case. It is also very valuable in determining the effects of medical or surgical treatment and of the more recent method of roentgen ray treatment. It is especially valuable in the diagnosis of border line cases.

3. It is a great aid in the diagnosis of hypothyroidism and especially in its treatment.

4. In diabetes mellitus, the basal metabolism is an aid in determining the rate of the various types of foods given during the course of the treatment and has probably thrown some light on the cause of acidosis. The rate itself is about normal and of little significance.

5. In pernicious anemia, basal metabolism throws new light on the oxidative processes going on in the body and is an aid in the treatment, especially in determining the effects of transfusion and diet. Some men believe that the height of metabolism is the measure of the severity of the disease.

6. Basal metabolism in the diseases of the pituitary gland is still an unknown factor but enough work has been done to show that remarkable results may come from experimentation in this condition.

7. The work of metabolism on patients with heart disease is also very meager but may give us valuable information about the development of acidosis as well as the cause of dyspnea and the proper diet to use in these cases.

8. The results of basal metabolism study in tuberculosis may revolutionize the present method of dietary treatment especially in active cases although it has not been as yet definitely proven. The same is true in typhoid fever and other febrile conditions.

#### CONCLUSION

Basal metabolic determinations are a valuable

aid in the diagnosis and treatment of diseases dependent upon endocrine dyscrasia especially in disorders of the thyroid gland. The metabolic rate probably indicates the end result of the interactivity of the endocrine glands, the major role of which is played by the thyroid gland.

Note:—The details of technique and sources of error in metabolism determinations had been dealt with very completely by Boothby and Sandiford in their book entitled "Technique of Basal Metabolism Determination."

### PARENTERAL INFECTIONS IN INFANCY\*

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The rapid rate of the growth of the infant makes great demands on the digestive and re-sorptive powers of the gastro-intestinal tract. Any derangement of its function leads to very serious consequences. Any infection or disturbance in the parenteral systems is mirrored in a disorder of the gastro-intestinal tract. Deaths from gastro-intestinal diseases in the past have been more numerous than from all other causes combined. The digestive disturbances of infancy can be roughly divided into acute and chronic diseases. It is interesting to follow the history of the etiology of these disturbances and to see the wide differences of opinion, and the fundamental changes in the various conceptions.

If we go back far enough, we shall, of course, reach the days when teething was held responsible for digestive disturbances as well as for all the other ailments that befell the infant. Later, bacterial infection of the bowels was held responsible for the high mortality rate from gastro-intestinal diseases. With the discovery that a great variety of organisms could be isolated and that no one organism played a predominant part, the conception of bacterial origin of gastro-intestinal diseases, except for that group of infectious diarrheas due to the Shiga organism, was gradually dropped. In the next period, the action of bacteria was considered an

indirect one, that is, spoiling food products and producing toxic substances which, in turn, give rise to enteric diseases. More recently, the mal-adjustment of the food to the individual digestive powers of the infant has been held responsible for the high mortality from gastro-intestinal ailments.

These ideas touch on two of the causative factors in intestinal diseases, namely, infections of the intestinal tract and improper adjustment of the food to the digestive powers of the infant. A third factor embraces the disturbances caused by constitutional anomalies. Czerny's classification comprises (1) disturbances due to infection, (2) disturbances due to alimentation, and (3) disturbances due to constitution. It is to a group of disturbances of digestion and nutrition caused by acute and chronic infections outside the gastro-intestinal tract that I wish to call your attention. It is well known that any infectious disease of the adult may be initiated by gastro-intestinal symptoms, such as anorexia, nausea, vomiting, constipation, or diarrhea. The same holds true for the infant. My reason for directing attention to this group is that to a great extent parenteral infections are being treated as infections or disturbances of the gastro-intestinal tract. The most serious feature of this misconception is the failure of the diagnostician to ascertain the cause of the diarrhea or anorexia so that the infection, unless self-limited, is allowed to progress. The so-called winter epidemics of cholera infantum are, in many instances, nothing more than marked reactions on the part of the gastro-intestinal tract to infections of the upper respiratory tract. In the summer, the season in which gastro-enteritis is prevalent, there is an even greater tendency to overlook the part of parenteral infections. In many infants, thriving on the breast, or on artificial food mixtures, acute bowel disturbances are of an infectious nature. In the summer, tonsillitis, and particularly follicular pharyngitis, are very frequently accompanied by severe intestinal disturbances.

Tonsillitis, nasopharyngitis, otitis, or pyelitis, etc., in infants may exist without causing local symptoms. This lack of local symptoms constitutes the main reason why the parenteral nature of the nutritional disorder is so easily over-

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looked. The general symptoms of fever, irritability and restlessness are readily ascribed to a gastro-intestinal disturbance with symptoms of nausea, vomiting, and frequent stools. This conviction is still further strengthened by the improvement in the general symptoms coincident with the results of free catharsis. This result naturally leads to acceptance of the view that the disturbance was of a gastro-intestinal nature. As a rule, these infections are of very short duration and the temperature seems to drop almost coincidentally with the effects of the catharsis. If a child has diarrhea, we are inclined too readily to ascribe the symptoms to gastro-enteritis. Often the child has gastroenteritis, but in many instances a careful physical examination reveals some parenteral infection which is responsible for the gastro-intestinal symptoms. If the infection is mild, the damage done by the use of cathartics for a day or two is not very great; if, however, the disease is otitis media or pyelitis and the temperature persists for a week or more, the results of continuous catharsis may be serious and endanger life. The complete emptying of the bowels unquestionably is of great benefit, and the response of the mucosa with increased secretion is of great importance. The reason so frequently given for continued catharsis is that the stools are green and, in spite of catharsis, remain so. If calomel is being used the stools will tend to be green. With the use of other cathartics, depending on how complete the hunger stool is, the shade will vary from brown to olive green. These olive green hunger stools in particular are wrongly interpreted as evidences of irritation, and catharsis is continued.

The harm done this way is two-fold: first, the excessive catharsis, and frequently starvation, and second, oversight of the underlying cause. The realization that an infection anywhere in the body has a very decided effect on the digestive processes is of the utmost importance. It is essential, therefore, that any infant with an acute disturbance should be carefully examined for parenteral infections. Inasmuch as they are relatively few the task is not difficult. Infections in infants beside the occasional infections of the gastro-intestinal tract are in most cases either those of the upper respiratory

tract or of the urinary tract. An affection of the upper respiratory tract is frequently difficult to localize when it involves the nasopharynx alone. If it is associated with swelling of the nasal mucous membrane, it becomes very evident by the noisy breathing and difficult nursing. It is important to remember that frequently in the first twenty-four hours of an acute infection of the throat there may be little, if any, redness or swelling of the fauces and only after twenty-four hours do the local signs become manifest. The common cold usually precedes the more severe manifestations of the bronchi, lungs, or ears. The interval between the cold and its complications may be extremely short, but almost invariably a period of one or more days intervenes. The more acute the onset of the illness, the more likely is the appearance of gastro-intestinal symptoms. The infection very markedly disturbs the secretion of the digestive juices and as a result the food remains undigested in the stomach, to be returned by vomiting or, if passed into the small intestine, setting up disturbances that give rise to diarrhea. Thus anorexia, vomiting, and diarrhea result from an infection elsewhere in the body which may give no signs locally and manifest itself only in the gastro-intestinal canal. It might be well to illustrate this type of infection by the report of a case:

A breast-fed child, who had been doing well for a period of months, became suddenly ill with vomiting and frequent stools. On physical examination, the findings, except for fever, were absolutely negative. A specimen of urine was free from pus. A cathartic was administered and the child seemed better the following day, but the fever still persisted. Numerous small grayish follicles were visible in the throat with considerable reddening about them. The child was kept on reduced feedings; the temperature was normal on the third day; the recovery was uneventful.

The patient on the first day appeared, without doubt, to be suffering from some primary gastro-intestinal disturbance, but by the findings in the throat the second day it was very evident that the disturbance of the bowels was secondary to the infection in the throat. The use of the cathartic was indicated to remove any undigest-

ed food that might irritate the intestinal tract. The uneventful recovery, therefore, would have made it appear, had no further examination been made, that the entire condition was due to a bowel disturbance.

The following case illustrates the importance of infections of the urinary tract:

An artificially fed infant, who had not been ill before, was taken for an automobile ride by its parents. Several hours later, after taking its bottle, it had repeated attacks of vomiting and numerous thin stools. The temperature was 103°. The physical examination was entirely negative. It was impossible to obtain a specimen of urine that evening. The child was given a cathartic and put on water for twenty-four hours. A provisional diagnosis of acute gastro-enteritis was made. A specimen of urine, obtained the following day, was loaded with pus cells and, on culture, revealed numerous colon bacilli. The fever lasted for one week. The child made an uneventful recovery on alkali treatment.

This type of case, even more frequently than those of gastro-enteritis secondary to respiratory infections, is likely to remain unrecognized, because in general practice it has not yet become the rule to examine the urine of infants. As a result, the majority of cases of pyelitis are still treated as if they were gastro-enteritis. Fortunately, some of these cases are not extremely severe and the infants recover in spite of the treatment. A good many, however, swell the number of reported deaths from gastro-enteritis in our mortality statistics.

I wish to emphasize once more that gastro-intestinal disturbances in the infant are very frequently due to infections in organs other than the gastro-intestinal tract and that localization of the infection is of the utmost importance in any febrile disturbance. Two examinations should never be neglected, the examination of the ears and the microscopic examination of the urine. In some instances a differential blood count may be of use. Generally speaking, a polymorphonuclear leukocytosis suggests a parenteral infection.

If we pass on to the group of chronic cases, we find that diagnosis is even more difficult. I am referring to the cases of atrophy that are due

to parenteral infection. These can be roughly classified under four heads: (1) syphilis, (2) tuberculosis, (3) chronic infections of the urinary tract, and (4) chronic infections of the upper respiratory tract.

The diagnosis of syphilis in the infant is relatively simple when there are external lesions, but such lesions may have disappeared or may never have been present. A positive Wassermann reaction, or bony changes, as seen in the roentgenograms may be the only means of determining the infection. The results are particularly bad in congenital syphilis without treatment, and even with treatment it is usually necessary to use breast milk in order to obtain satisfactory results.

In cases of atrophy due to tuberculosis, specific symptoms may be entirely absent. Occasionally there may be cough, suggestive of whooping cough, due to an enlargement of the bronchial lymph nodes, that calls attention to the possibility of a tuberculous infection. The von Pirquet skin test is a very valuable help in the diagnosis, as is also a positive Despine sign. The prognosis is usually bad, and the number of recoveries from tuberculous infection during the first year is small.

In the third group, chronic infections in the urinary tract, there is a considerable number of cases. There seems to be a double relationship between pyelitis and gastro-enteritis. Acute infections of the urinary tract give rise to acute digestive symptoms, and the persisting infection gives rise to a lowered digestive capacity of the gastro-intestinal tract. On the other hand, the diarrheal disturbances are frequently associated with bacilluria and pyelitis. It is therefore of the utmost importance that in all cases, even without febrile periods, the urine be examined, as it is only after the clearing up of the infection that satisfactory nutritional results can be achieved.

The chronic infections of the upper respiratory tract, particularly those associated with chronic otitis medias, frequently cause atrophy. The same is true of chronic bronchitis. Many of the infants suffer from rickets also and, unless this is properly treated, it is practically impossible to free them from infections of the respiratory tract. In these cases in particular very remarkable results are obtained by the ad-



ministration of cod liver oil and phosphorus, which frequently act as a specific in clearing up chronic bronchitis.

I have tried to present to you, very briefly, the importance of an exact diagnosis in the interpretation of that symptom in infants that is most often made the object of treatment, namely, diarrhea, and I have attempted to show various factors that may be responsible for this symptom and the danger of treatment, unless a diagnosis has been made. I have tried further to show the importance of primary emptying of the bowels in all acute infections and the danger of prolonged catharsis.

In conclusion, let me repeat again that diarrhea is a condition that may be caused by a variety of factors, many of which lie outside of the gastro-intestinal tract.

#### DISCUSSION

DR. ROOD TAYLOR, Minneapolis: Dr. Helmholtz has most admirably presented a subject which is of great importance to all of us who treat children. When one of us becomes ill with pneumonia, tonsillitis, fever of any kind, we as a rule lose our appetite. We do not want to eat, but we do want to drink. The baby's food is largely liquid; he does not distinguish between thirst and hunger. When suffering with one of these parenteral infections, he is apt to take more milk than he can digest because of his desire for fluid, and this will frequently produce diarrhea. In the city of Minneapolis, we have found that the great majority of cases of diarrhea we have to deal with are not due to improper feeding, nor to infections of the intestinal tract, but are due to infections elsewhere—infections of the ear, throat, chest, and kidneys. Dr. Helmholtz has wisely stressed the importance of making a correct diagnosis so that correct treatment can be instituted.

I would also like to say a word about something which Dr. Helmholtz mentioned, and that is chronic parenteral infection. We are all of us familiar with the adult with advanced tuberculosis who has chronic diarrhea and on whose body at autopsy we find no tuberculous lesions of the intestine. We occasionally see children who come in, 4 or 5 years of age, with a chronic diarrhea, having 6 or 7 stools daily, the stools containing no pus or blood. There will be oftentimes no physical signs in the chest, and a negative cutaneous tuberculin test. The x-ray picture in these cases shows tuberculous infiltration of the lung. I have seen two children, both of whom had diarrhea lasting three months, which resulted from a different type of parenteral infection. The diarrhea in one case ceased within twenty-four hours after an abscess in the middle ear was opened, and in the other it ceased shortly after a large mass of infected adenoids were removed.

## ON THE PREVENTABILITY OF CERTAIN CASES OF CHRONIC NEPHRITIS\*

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Three authoritative and stimulating papers referable to chronic nephritis and its problems have been recently published. Christian has discussed the deficiencies in our present methods for the treatment of this disease and has shown clearly that present therapy is largely symptomatic and is based on our knowledge of renal function rather than on anything deeper. Preventive treatment is almost nonexistent and will remain so until more is known of the etiology of chronic nephritis, and particularly of the factors that influence the progressive development of renal lesions.

Mackenzie has pointed out that almost all medical research in the recent past has been restricted chiefly to laboratories and in a less degree to hospital wards, where disease has been studied only after it has reached an advanced stage or after it has killed the patient. In Mackenzie's judgment the future of medicine does not depend so much on research work under these conditions as on observations made in the earliest stages of the disease when its course may be amenable to treatment or mitigation.

Finally, Joslin has written on the prevention of diabetes mellitus. This paper is one of the first to deal specifically with the prevention of any chronic progressive disease of unknown etiology. Yet Joslin produces facts to prove that diabetes in many cases is a preventable disease and states that the physician should consider it as important to prevent diabetes as to prevent small-pox or typhoid fever.

These three papers are very suggestive: The first because it emphasizes how unsatisfactory is the present method of treatment of chronic nephritis and because it hints at what the second discusses in greater detail, namely, certain fallacies in our present methods of clinical research; and the third because it shows how a chronic and progressive disease of unknown etiology such as diabetes may be preventable in

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many persons. It would seem possible that nephritis, also a chronic and progressive disease, may be preventable in many persons if only its problems are attacked from a new angle and early in its development instead of late.

So critical a pathologist as Mallory believes that chronic nephritis is due originally to a toxic lesion which is of several varieties, but is most commonly bacterial. The initial lesion is usually acute but may be recurrent or chronic. It may terminate in complete recovery if the patient survives or in a more gradual sclerosis in the capsular space, glomerulus, or blood vessels as the result of the processes of repair. Sclerosis of the kidney, as it appears at necropsy, is the sum total of sclerosis affecting parts or the whole of many or all of the units of the kidney and is due to repeated acute or chronic toxic insults.

There is increasing bacteriologic evidence to support the belief that chronic nephritis is often of infectious origin. Davis, for example, cultured the tonsils from ten cases of nephritis and in nine found hemolytic streptococci the predominating organism. Le Count and Jackson injected rabbits with streptococci from cases of acute tonsillitis and found renal lesions in more than half of their inoculated animals. They believed that these organisms besides causing acute nephritis also produced a characteristic chronic disease of the kidney in a certain number. Klotz injected various strains of *Streptococcus viridans* into rabbits and was able to produce a form of acute interstitial nephritis which developed subsequently into well marked renal sclerosis. As a result of such experiments, attempts have been made to treat nephritis by the removal of possible foci of infection. Billings reported six cases which were greatly improved after tonsillectomy. Crowe, Watkins and Rothholz followed the course in eighteen cases of varying degrees of severity from seven months to three years after the tonsils were removed. Two patients with advanced nephritis died, the operation having had no obvious effect on the disease. The other patients were much improved or well. Finally, the work of Bumpus and Meisser shows that pyelonephritis is often due to a diseased tooth or tonsil harboring streptococci which have a selective affinity for the urinary tract, and that the colon bacillus which is commonly found in

the urine of such patients and which is generally believed to be the cause of the disease is of secondary importance. Removal of the original focus, in their experience, had been followed by great improvement in the condition of the genito-urinary tract.

On the whole there is considerable evidence from pathologic, bacteriologic, and clinical standpoints to show that chronic nephritis begins as an infection which is often influenced by organisms found in diseased teeth and tonsils, and that removal of such foci of infection may be followed by general improvement. In view of these facts it has seemed of interest to follow a group of patients with nephritis for a period of several years in an attempt to collect evidence with regard to the early development and possible prevention of chronic nephritis. For this purpose the records of all persons under 40, in whom a diagnosis had been made were selected from the records of the Mayo Clinic for the year of 1918. This age limit was arbitrarily fixed in order to exclude as far as possible arteriosclerotic nephritis and to include the more inflammatory type of glomerulonephritis. The year 1918 was chosen because it allowed between two and three years to pass since the patients were first seen, and because at that time in the Clinic most of these patients received a special throat examination and a phenolsulphonephthalein test besides the routine physical examination, blood pressure determination, and urinalysis. Letters of inquiry were sent to the thirty-two patients so selected.

The material which is the subject of this paper can be logically divided into two groups: one consisting of cases of true nephritis with definite signs, and the other of cases of less marked nephritis in which the proper diagnosis was at first uncertain, although the presence of albuminuria and of renal elements in the sediment suggested that kidney disease was the underlying cause of the symptoms which were encountered (Table 1).

Fifteen of the patients were males; eight are known to be dead. On looking over the records it is clear that all but one had a bad prognosis from the moment they were first seen. One patient (Case 8) had had a tonsillectomy performed. Information was not obtainable con-



cerning the effect of this operation on the course of the disease. The patients in Cases 2 and 5 deserve a special note.

*Case V.* The patient had evidence of mild nephritis which seemed to be markedly exaggerated by a gastroenterostomy for duodenal ulcer. It is possible that this case was analagous to those following gastroenterostomy described by Tucker, and that the exacerbation of the kidney disease was derived from duodenal proteose. In any event as the patient died a month after operation, the surgical operation was not a useful preventive measure.

*Case II.* The patient entered the Clinic in 1918 with a history suggestive of early nephritis. At that time his renal function was nearly normal. The phenolsulphonephthalein excretion was high, there was no fixation of specific gravity, and there was evidence in the sediment of considerable cellular exudation. His tonsils were not removed despite the fact that they were enlarged and draining pus. He returned fifteen months later with signs of marked renal insufficiency, with a diminished phenolsulphonephthalein output, a low fixed specific gravity, and with little in the sediment except rarely a cast. Necropsy showed a typical chronic parenchymatous nephritis. This patient might have been benefited by early tonsillectomy.

The seven patients who are still alive had their tonsils removed, and all except one are strikingly better. The patient in Case 15 gave a history in 1918 of edema and headache dating back about 18 months. This patient has not improved. He finds it difficult to work; his urine contains albumin, and his blood pressure is appreciably higher than it was when he first was examined.

Of course it is unjustifiable to draw conclusions from these data, as the condition in the tonsillectomized patients was more acute and less advanced than in those who were not operated on and died, and would possibly have recovered spontaneously. However the fact remains that the tonsillectomized patients have not progressed in their nephritis and, therefore, the operation was harmless and may have been a good therapeutic and prophylactic measure (Table 2).

The six women with true nephritis are strikingly different from the men, as all but one developed symptoms of kidney disease during pregnancy; two of these died, one, who had been tonsillectomized, dying of nephritis in the eighth month of a later confinement. The other patient

was not operated on and died of rapidly progressing Bright's disease.

One of the three patients who are still alive has been tonsillectomized. Her urine is normal and she is leading an active life, although her blood pressure is still elevated. The other two patients are not improving. Neither has been tonsillectomized. One probably has essential hypertension and the other chronic progressive nephritis.

These five cases illustrate the importance of pregnancy as an etiologic factor in nephritis in young women. It is possible that this type of the disease can be prevented in many cases by early diagnosis. During pregnancy routine urine and blood pressure examinations should be insisted on, and the ordinary rules of hygiene should be enforced. A woman with a history of renal insufficiency during one pregnancy who later becomes pregnant should be watched with special care. Finally, symptoms of impending renal insufficiency should receive immediate treatment.

The sixth patient in this group has been under constant observation for three years and has been treated vigorously with a view toward the prevention of chronic nephritis (Table 3). It appears that the patient has a progressive nephritis which has not been influenced by the removal of diseased tonsils, gallbladder, or appendix. It remains to be seen whether the removal of two teeth which show definite periapical abscesses will be of any benefit.

As a whole, these twenty-one cases are of considerable interest. They illustrate the gravity of nephritis in young persons; the importance of pregnancy as an etiologic factor in women; the fact that all cases are not progressive and that a certain proportion of patients recover. They suggest that there are two definite methods for the possible prevention of chronic nephritis. The first is by surgical removal of sources of renal infection in early cases; the second is by proper medical supervision of pregnant women.

The cases in the second group are less sharply defined. They consist of young persons who presented themselves for examination on account of an indefinite train of symptoms such as headache or backache, recent loss of weight and strength, or a general sensation of lassitude. Physical examination was negative except for a

slight peripheral arteriosclerosis or hypertension. The urine, however, uniformly contained albumin and varying amounts of casts, erythrocytes, or leukocytes. It was impossible to determine at the time these patients were first seen whether they had true nephritis or were merely tired out and needed rest and hygiene. The details of this group are shown in Tables 4 and 5.

The most striking feature of the patients as a whole is the fact that none have so far developed definite signs of chronic nephritis. These cases appear, therefore, to bear much the same relation to Bright's disease that "renal glycosuria" does to diabetes, and afford no evidence with regard to whether chronic progressive nephritis ever begins in such an indefinite fashion. It would be of great interest to follow a larger group of such patients for a much longer time.

A second striking point concerning these patients is that all but one had definitely abnormal tonsils. The closeness of the relationship between septic tonsilitis, albuminuria and the vague symptoms complained of is questionable. However, five of the ten patients with diseased tonsils had tonsillectomies, and five did not. It is interesting that only one of those not operated on (Case 5) should feel well now, while all of the five patients operated on should be normal so far as they know, with the exception of one (Case 6), who has a few red blood corpuscles in his urine.

#### SUMMARY

This review of the course of a limited number of young persons with symptoms of nephritis over a period of about three years, brings out a few interesting features. In the first place, the material divides itself sharply into cases of true nephritis and into cases in which a diagnosis is impossible. Preventive measures against the development of true nephritis can be logically undertaken. Septic teeth and tonsils undoubtedly play a part in the speed with which the disease develops, and should be removed. In this connection, however, it must be remembered that normal tonsils and teeth should not be sacrificed indiscriminately. Furthermore, the removal of teeth or tonsils from a nephritic patient may be a serious operation and may be followed by an acute exacerbation of the disease with oliguria, and uremia. Therefore, such operations

should not be performed without due consideration and the patients should be prepared by a preoperative course of treatment. The nephritis of pregnancy is such an important etiologic factor in this series as to justify the generalization that all pregnant women should have most careful medical supervision and any signs of impending renal insufficiency should be treated at once, thus probably preventing the development of chronic nephritis in a certain number of cases.

Finally, there are large numbers of young adults with albuminuria with but indefinite symptoms of nephritis who do not develop a rapidly progressive type of kidney disease. The exact relationship of such cases to chronic nephritis is uncertain and requires further study. They offer a possible means for observing the early manifestations of a slowly contracting kidney.

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Note:—See following tables.



Table 1  
CASES OF PROBABLE NEPHRITIS IN MALES

| Case     | Age | Date of entry | Previous history                     | Present illness   | Tonsils                         | Systolic blood pressure | Diastolic blood pressure | Urinalysis   |      |      |           |           |  | Phenol-sulphone-phthalein | Tonsillectomy | Subsequent course   |
|----------|-----|---------------|--------------------------------------|---|---------------------------------|-------------------------|--------------------------|--------------|------|------|-----------|-----------|--|---------------------------|---------------|---|
| 22008226 |     | 1-25-18       | Diphtheria, scarlet fever, grippe    | Nausea and vomiting 2 years. Shortness of breath a few weeks.   | No record                       | 214                     | 148                      | Large trace  | 1008 | Few  | Rare      | Rare      |  | 5                         | No            | Died of nephritis 3 months later.   |
| 22527432 |     | 3-6-18        | Diphtheria, tonsillitis, gonorrhea.  | Swelling of legs 2 months.  | Slightly enlarged; drain pus    | 120                     | 80                       | Large amount | 1026 | Many | 0         | Rare      |  | 60                        | No            | Died of nephritis 15 months later.  |
| 24588716 |     | 9-16-18       | Chronic rheumatism.                  | General edema 18 months.  | Slightly enlarged; mucus plugs  | 140                     | 86                       | Large trace  | 1015 | Few  | 0         | Rare      |  | 25                        | No            | Died 2.5 years later. Cause of death not recorded.                                |
| 24763028 |     | 10-3-18       | Grippe                               | Nocturia and headache 3 months.   | Slightly enlarged; mucus plugs. | 220                     | 110                      | Large amount | 1015 | Rare | Mod-ate   | 0         |  | 25                        | No            | Died of nephritis 4 months later.   |
| 24915237 |     | 10-21-18      | Diphtheria, tonsillitis, gonorrhea.  | Operation for duodenal ulcer. Developed edema and ascites immediately afterward.                                | Not enlarged; mucus plugs.      | 118                     | 68                       | Large trace  | 1016 | Rare | Mod-ate   | Numer-ous |  | No record                 | No            | Died a month later. Cause of death not recorded.                                  |
| 24297632 |     | 8-20-18       | Diphtheria                           | Dyspnea 2 months  | Much enlarged; drain pus        | 240                     | 130                      | Large amount | 1014 | 0    | Numer-ous | Rare      |  | 15                        | No            | Died 3 weeks later. Cause of death not recorded.                                  |
| 23155933 |     | 5-16-18       | Scarlet fever, pneumonia, gonorrhea. | Pain in chest and dyspnea 7 months.   | Not enlarged; mucus plugs       | 110                     | 60                       | Large amount | 1014 | Many | Many      | Many      |  | No record                 | No            | Died 9 days later. Necropsy showed ulcerative endocarditis and chronic nephritis. |
| 22715525 |     | 4-5-18        | Grippe and gonorrhea                 | Life insurance examiners diagnosed kidney disease 2 years before. Easily tired, and short of breath for 1 year. | Slightly enlarged; mucus plugs  | 150                     | 90                       | Large amount | 1015 | Few  | 0         | Rare      |  | 30                        | 4-10-18       | Date and cause of death not known.  |

Table 1 continued

|        |    |         |  |   |                                 |     |     |              |      |      |      |      |           |         |   |
|--------|----|---------|--|---|---------------------------------|-----|-----|--------------|------|------|------|------|-----------|---------|---|
| 230196 | 17 | 5-2-18  | Scarlet fever.   | Swelling of face and feet immediately after scarlet fever 3 weeks before.               | Much enlarged; drain pus.       | 152 | 100 | Large amount | 1012 | Rare | Many | Many | 30        | 1-27-19 | Feels well. Urine reported normal. Works full time. Gained 40 pounds.   |
| 236693 | 8  | 6-27-18 | Whooping cough, scarlet fever  | Albuminuria after scarlet fever 8 months before   | Slightly enlarged; mucus plugs. | 110 | 78  | Trace        | 1017 | 0    | 0    | 0    | No record | 7-10-18 | Feels well except for headache while studying. Urine "improved." No record of blood pressure.   |
| 252752 | 30 | 12-5-18 | Typhoid fever.   | Edema and headache for 18 months  | Slightly enlarged; drain pus    | 130 | 78  | Large trace  | 1018 | Few  | Rare | Rare | 50        | 12-18   | Works full time. No endurance. Albumin in urine. Blood pressure 145. Not improved.  |
| 247192 | 24 | 9-30-18 | Scarlet fever, grippe, tonsillitis; nephritis with dropsy after scarlet fever 16 years before. | Rejected from army for albuminuria. Feels in perfect health.                            | Absent                          | 160 | 110 | Large trace  | 1024 | Rare | 0    | 0    | 50        | 1914    | Great improvement in general condition following tonsillectomy. No change in past 3 years. Urine reported unchanged. Works full time. Has gained 10 pounds. |
| 225017 | 24 | 3-16-18 | Grippe   | High blood pressure for 3 years with intermittent albuminuria. Palpitation on exertion. | Much enlarged; drain pus.       | 167 | 100 | Trace        | 1014 | 0    | 0    | 0    | 60        | 4-2-18  | Feels well. Urine reported normal. Blood pressure "a little elevated." Works full time.   |
| 247286 | 12 | 9-30-18 | Measles, scarlet fever, tonsillitis.   | Sudden and persistent edema following tonsillitis 5 months before.                      | Slightly enlarged; drain pus.   | 200 | 130 | Large amount | 1020 | Many | 0    | Rare | No record | 5-6-19  | Feels well. Urine reported "showing very little." Works full time. Gained 20 pounds.  |
| 233201 | 10 | 6-1-18  | Mumps, measles, tonsillitis.   | Edema, nausea, vomiting and convulsions developing 6 weeks before.                      | Slightly enlarged; mucus plugs. | 120 | 82  | Large trace  | 1016 | 0    | Many | Rare | No record | 9-27-18 | Feels well. Urine reported normal. No record of blood pressure. Works full time.  |



Table 2  
CASES OF PROBABLE NEPHRITIS IN FEMALES

| Case   | Age | Date of entry | Previous history                            | Present illness  | Tonsils                         | Systolic blood pressure | Diastolic blood pressure | Albumin      | Specific gravity | Casts | Erythrocytes | Leukocytes | Phenol-sulphone-phthalein | Tonsillectomy | Subsequent course   |
|--------|-----|---------------|---|--|---------------------------------|-------------------------|--------------------------|--------------|------------------|-------|--------------|------------|---------------------------|---------------|---|
| 229799 | 27  | 5-2-18        | Tonsillitis and grippe.                     | Edema and convulsions with pregnancy 3 years before. Epileptiform convulsions since. | Slightly enlarged; mucus plugs. | 140                     | 100                      | Trace        | 1017             | 0     | 0            | 0          | 50                        | 5-10-18       | Died of nephritis in eighth month of pregnancy, 16 months after examination.  |
| 230051 | 32  | 5-3-18        | Scarlet fever and tonsillitis.              | Edema and convulsions 18 months before when pregnant; weakness and edema since.      | Slightly enlarged; mucus plugs. | 150                     | 116                      | Large trace  | 1007             | 0     | Rare         | Few        | 15                        | No            | Died of nephritis 16 months after examination.  |
| 236784 | 32  | 7-5-18        | Tonsillitis                                 | Albumin and edema with pregnancy 2 years before. Weak and tired.                     | Slightly enlarged; mucus plugs. | 200                     | 135                      | Large trace  | 1012             | 0     | 0            | 0          | 50                        | No            | Not improving. Unable to work. Urine albumin free but of low specific gravity. Blood pressure: systolic 200; diastolic 110. |
| 222495 | 26  | 2-18-18       | Negative                                    | Edema with pregnancy which ended 6 weeks before.                                     | No record                       | 125                     | 60                       | Trace        | 1022             | Few   | Rare         | Rare       | 55                        | No            | Not improving. Unable to work. Swelling of legs; backache. No record of urine or blood pressure.                            |
| 176780 | 21  | 3-18-18       | Frequent tonsillitis.                       | Edema and headache in fifth month of pregnancy.                                      | Slightly enlarged; mucus plugs. | 154                     | 116                      | Large amount | 1012             | Few   | Rare         | Rare       | No record                 | 3-28-18       | General condition good. Urine normal. Blood pressure: systolic 145; diastolic 85. Able to work full time. Tired; backache.  |
| 48525  | 21  | 10-22-18      | Diphtheria, pneumonia, tonsillitis, grippe. | Nervous; tires easily. Lost 15 pounds in 3 months.                                   | Slightly enlarged; mucus plugs. | 130                     | 86                       | Large trace  | 1025             | Few   | Few          | Rare       | 50                        | 11-6-19       | General condition improved. Urine contains albumin, blood casts, leukocytes. Blood pressure, systolic 148; diastolic 100.   |

Table 3  
COURSE OF PROBABLE NEPHRITES IN PREVENTIVE TREATMENT OF CHRONIC NEPHRITIS

| Case  | Age | Date of entry | Previous history                            | Present illness                                    | Tonsils                         | Systolic blood pressure | Diastolic blood pressure | Albumin      | Specific gravity | Casts | Erythrocytes | Leukocytes | Phenol-sulphone-phthalein | Tonsillectomy | Subsequent course              |
|-------|-----|---------------|---|--|---------------------------------|-------------------------|--------------------------|--------------|------------------|-------|--------------|------------|---------------------------|---------------|--------------------------------|
| 48525 | 29  | 10-22-18      | Diphtheria, pneumonia, tonsillitis, grippe. | Nervous. Tires easily. Lost 15 pounds in 3 months. | Slightly enlarged; mucus plugs. | 130                     | 86                       | Large trace. | 1025             | Few   | Few          | Rare       | 50                        | 27            |                                |
|       |     | 1-6-19        |   |  |                                 |                         |                          |              |                  |       |              |            |                           |               | Tonsillectomy.                 |
|       |     | 1-15-19       |   |  |                                 |                         |                          |              |                  |       |              |            |                           |               | Cholecystectomy. Appendectomy. |
|       |     | 7-31-19       |   |  |                                 | 126                     | 82                       | Large trace  | 1024             | Rare  | Few          | Rare       | 40                        |               |                                |
|       |     | 10-30-19      |   |  |                                 |                         |                          | Large trace  | 1017             | Rare  | Rare         | Rare       | 40                        |               |                                |
|       |     | 1-23-20       |   |  |                                 | 140                     | 84                       | Large trace  | 1015             | Many  | 0            | Rare       | 45                        | 23            |                                |
|       |     | 1-10-21       |   |  |                                 | 148                     | 100                      | Large trace  | 1019             | Rare  | Rare         | Rare       | 55                        | 41            |                                |



Table 4  
CASES OF INDEFINITE NEPHRITIS IN MALES

| Case   | Age | Date of entry | Previous history                                     | Present illness                             | Tonsils                         | Systolic blood pressure | Diastolic blood pressure | Albumin      | Specific gravity | Cast | Erythrocytes | Leukocytes | Phenol-sulphone-phthalein | Tonsillectomy | Subsequent course   |
|--------|-----|---------------|--|---|---------------------------------|-------------------------|--------------------------|--------------|------------------|------|--------------|------------|---------------------------|---------------|---|
| 242817 | 31  | 8-20-18       | Tonsillitis and pneumonia.                           | Backache and nocturia.                      | Moderately enlarged; drain pus. | 115                     | 78                       | Trace large  | 1033             | Rare | 0            | Rare       | 55                        | No            | Complains of languor and backache as before. Urine normal. Blood pressure: systolic 126; diastolic 82.                                      |
| 251907 | 15  | 11-26-18      | Pneumonia, whooping cough, measles, and tonsillitis. | Chronic nocturia.                           | Much enlarged; mucus plugs      | 146                     | 90                       | Large amount | 1016             | Rare | 0            | Rare       | 50                        | No            | No complaint, but under treatment by chiropractor for kidney trouble and arthritis. Urine contains no albumin. No record of blood pressure. |
| 235280 | 14  | 6-18-18       | Measles  | Recurrent attacks of vomiting and headache. | Much enlarged; mucus plugs.     | 145                     | 100                      | Large trace  | 1017             | Rare | Rare         | Rare       | 70                        | 6-27-18       | Feels well. Has not seen doctor since operation.  |
| 242023 | 20  | 8-28-18       | Tonsillitis and grippe.                              | Nocturnal emissions.                        | Slightly enlarged; mucus plugs. | 150                     | 80                       | Large trace  | 1033             | 0    | Rare         | Rare       | 60                        | 8-17-18       | Feels well. No evidence as to urine or blood pressure.  |
| 247877 | 28  | 10-9-18       | Pneumonia and grippe.                                | Headache and pain in legs.                  | Slightly enlarged; mucus plugs. | 170                     | 80                       | Large trace  | 1028             | Rare | 0            | 0          | 55                        | No            | Feels well. Urine normal. No record as to blood pressure.   |
| 250501 | 17  | 11-8-18       | Negative   | Lumbar pain.                                | Right; tags-left, out.          | 120                     | 60                       | Large trace  | 1015             | 0    | Rare         | Rare       | 50                        | 1919          | Feels well. Urine contains a few erythrocytes. Blood pressure normal.   |

Table 5  
CASES OF INDEFINITE NEPHRITIS IN FEMALES

| Case   | Age | Date of entry | Previous history                | Present illness                          | Tonsils                         | Systolic blood pressure | Diastolic blood pressure | Albumin     | Specific gravity | Casts | Erythrocytes | Leukocytes | Phenol-sulphone-phthalein | Tonsillectomy | Subsequent Course  |
|--------|-----|---------------|---------------------------------|--|---------------------------------|-------------------------|--------------------------|-------------|------------------|-------|--------------|------------|---------------------------|---------------|--|
| 250693 | 39  | 11-12-18      | Tonsillitis and grippe          | Chronic gastric flatulence and nocturia. | Slightly enlarged; mucus plugs. | 120                     | 86                       | Large trace | 1010             | 0     | 0            | Rare       | 60                        | No            | No change in symptoms. Urine normal. Blood pressure: systolic 130.                     |
| 231702 | 25  | 5-17-18       | Negative                        | Chronic indigestion.                     | Slightly enlarged; drain pus.   | 110                     | 75                       | Large trace | 1025             | Few   | 0            | Rare       | No record                 | No            | No change in symptoms. Passed through pregnancy. No record of urine or blood pressure. |
| 219177 | 14  | 1-15-18       | Diphtheria, and tonsillitis     | Constant frontal headache.               | Slightly enlarged; drain pus.   | 100                     | 75                       | Large trace | 1027             | 0     | Rare         | Rare       | No record                 | 3-23-21       | Feels well. No record of urine or blood pressure.                                      |
| 244977 | 17  | 9-7-18        | Tonsillitis, and grippe.        | Attacks of precordial pain for 1 year.   | Slightly enlarged; drain pus.   | 138                     | 70                       | Trace       | 1021             | 0     | 0            | 0          | No record                 | 9-11-18       | Feels much better. No record of urine or blood pressure.                               |
| 225716 | 28  | 3-28-18       | Tonsillitis, pneumonia, grippe. | Backache and headache.                   | Normal.                         | 110                     | 36                       | Large trace | 1017             | 0     | 0            | 0          | No record                 | No            | Feels well. No record of urine or blood pressure.                                      |



# MINNESOTA MEDICINE

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## EDITORIAL

### THE CANCER CAMPAIGN

The American Society for the Control of Cancer was founded in New York in May, 1913. Its Board of Directors consists of sixty of the ablest internists, surgeons, and pathologists in this country and Canada, and twenty prominent lay citizens.

The increasing incidence of cancer and the annually increasing death rate from the disease necessitated the organization of such a society for the purpose of disseminating knowledge concerning the symptoms, diagnosis, treatment and prevention of cancer, and to investigate the conditions under which cancer is found.

In establishing an organization with this purpose, the founders believed that a nationwide campaign of public education regarding cancer would save thousands of lives now needlessly sacrificed every year because of ignorance of the warning signs of this disease and delay in seeking competent medical advice and treatment even after the symptoms are recognized.

The society has set aside the first week of

November as National Cancer Week, and during that time an intensive cancer campaign will be waged. In the State of Minnesota the campaign will be conducted under the auspices of the State Medical Association, the State Public Health Association, the State Board of Health, and the State University.

The need of a cancer campaign in the State of Minnesota is obvious, from the statistics compiled by the State Board of Health and recently made public by Doctor Chesley. He states that the deaths from cancer in 1920 exceeded those from tuberculosis, and that while the death rate from tuberculosis dropped from 94 per 100,000 in 1919 to 90 per 100,000 in 1920, the deaths from cancer in 1920 showed an increase of 2 per cent over the deaths from cancer in 1919.

The American Society for the Control of Cancer has long been educating the American public and has prepared a list of facts about cancer that might well be published broadcast.

1. Cancer begins as a small local growth which can often be safely and easily removed in the early stages by competent surgical treatment, or in certain favorable cases by radium, x-ray, or other methods.

2. The beginning of cancer is usually painless; for this reason its onset is doubly insidious, and other danger signals must be looked for and heeded in time.

3. Cancer is not a constitutional or blood disease and there should be no thought of disgrace or hereditary taint associated with it.

4. Cancer is not a contagious disease and there is no danger from living in the same house or from contact with a patient.

5. In ordinary sense, cancer is not inherited. Some authorities believe that there may be inheritance of a certain tendency to the disease, but even this is not clearly established. The disease is so frequent that, by the very law of chance, many cases will occur in some families. Life insurance companies do not regard cancer in the family as a reason for rejecting applicants or increasing premiums.

6. A persistent lump in the breast, or continued abnormal discharge or bleeding, should take a woman to her doctor forthwith. The

increased flowing which frequently occurs at the change of life is always suspicious, as is the return of flowing after it has stopped.

7. Sores, cracks, lacerations, lumps, and ulcers which do not heal, warts, moles, or birth-marks which change color or appearance are danger signs which demand competent medical investigation and treatment.

8. Persistent indigestion in middle life, with loss of weight and change of color, may mean internal cancer.

This knowledge saves lives, and should be brought home to the public, for the plain facts about cancer are not generally known. Cancer theories and cancer cures have their fascination for the curious, but nothing can exceed the usefulness of making what is now known of cancer a commonplace in every household in the country.

### EPIDEMIC POLIOMYELITIS IN MINNESOTA 1921\*

The poliomyelitis outbreak was first recognized by doctors at Sebeka and Wadena. The cases presented symptoms quite different from those of previous epidemics, the meningeal type rarely seen in previous epidemics predominating. This type is recognized and clearly described in the literature but it was only after many laboratory examinations of spinal fluid that it was proven to the satisfaction of everyone that the outbreak was not meningitis but poliomyelitis.

Another point of difference is that multiple cases have been found in families with history of contact between paralyzed cases. In the 1916 epidemic, multiple cases and history of contact between paralyzed cases was exceedingly rare. In 1916 we included as poliomyelitis cases, those with paralysis and those associated with paralyzed cases who had similar symptoms but not paralysis. Such associated cases had tenderness and weakness of the muscles without definite paralysis or atrophy or lasting muscular impairment and were classed as abortive type.

This year the reports and investigations by

the epidemiologists indicate that the spread and peculiar distribution of poliomyelitis as it is recognized with paralysis may be due to the fact that a very large number of people are infected with poliomyelities for a short time, but, owing to a degree of immunity or some other circumstance, do not develop paralysis but may transmit infection to children or others who develop paralysis because they have no immunity.

The evidence given in the present epidemic indicates that these mild cases without paralysis, whether associated with paralyzed cases or not, may really be poliomyelitis infections. If this is correct, the peculiar distribution of cases as previously recognized, and the occurrence of isolated paralyzed cases in rural districts is not difficult to explain.

Today, Aug. 26, the crest of the epidemic seems to have passed. The disease has spread peripherally from the epidemic centers in Wadena and Norman Counties and also along the main lines of railway and auto travel. This suggests that the large tourist traffic is a factor in the spread of the infection.

While the fatality rate is practically the same as in 1916, in general the cases are not so severe and reports indicate that compared with the 1916 epidemic, few will suffer permanent paralysis or deformity. Dr. J. C. McKinley of the Neurological Department, University Medical School, has been making a special study of cases with the State Board of Health epidemiologists. His tests with faradic and galvanic current do not give any new information of assistance in diagnosis, but in making a careful neurological study of the so-called abortive cases after the acute symptoms subsided, he demonstrated that certain muscle groups showed atrophy and weakness when compared with the same groups in the unaffected limb indicating that even in these mild cases which would not be classed as abortive poliomyelitis unless associated with paralyzed cases, there was a cord lesion of some degree.

The State Board of Health requests early reports of recognized and suspected cases. Such reports should be sent by telegram or telephone, collect, to the Division of Preventable Diseases, University Campus, Minneapolis. The reports

\*Being the remarks brought up to date by Dr. A. J. Chesley, Executive of the Minnesota State Board of Health, at the annual meeting of the State Medical Association in Duluth, August 1921.



of this Division are as follows, and when the epidemic curve is plotted on the basis of date of first symptoms, it will probably coincide with that of the 1916 epidemic.

| Month                             | No. Cases | San. Distr. | Coun- ties | Deaths |
|-----------------------------------|-----------|-------------|------------|--------|
| May .....                         | 3         | 2           | 2          | 0      |
| June .....                        | 57        | 16          | 8          | 3      |
| July .....                        | 167       | 67          | 25         | 20     |
| August .....                      | 258       | 135         | 46         | 22     |
| September 1 to 23 inclusive ..... | 112       | 72          | 42         | 7      |

To date, cases have been reported from 70 of the 86 counties in the State. It is interesting to note that during the 1916 epidemic practically no cases occurred in Wadena County.

### THE VETERAN'S BUREAU

The passage of the Sweet bill by Congress and its approval on August 9, 1921, by the President, changes the name of the Bureau caring for the relief of discharged soldiers and places the activities of the War Risk Insurance and Vocational Training Bureaus under one Bureau directly responsible to the President, to be known as the Veteran's Bureau. Reports from Washington indicate that this Bureau will receive an appropriation amounting to some five hundred million dollars, and it is hoped that much of the criticism of Uncle Sam's care for disabled discharged soldiers will cease. In fairness it should be stated that the federal government has carried out unprecedented activities for the relief of those suffering as a result of the World War. No machinery existed for the conduct of such relief measures and the facilities of the United States Public Health Service were utilized. These activities were transferred to the Bureau of War Risk Insurance on April 19th of this year by order of the Secretary of the Treasury.

Advantage has been taken of the government, either consciously or subconsciously, in a large percentage of the claims presented. The psychology of the discharged soldier as regards compensation is much the same as in the case of the personal injury suit. Elated by his return to home shores and eager for his discharge from service the soldier was only too

ready to declare himself in perfect health. This return to his former more or less hum-drum life, either at his former occupation or in search of a job, put a strain on the average man's nervous system. He felt he was not the same man he was before service and that his service was responsible for the change. Some acquaintance was receiving a monthly check from the government; why shouldn't he?

It is a question whether it would not have been a better policy all around to have made an estimate of the soldier's disability, either upon discharge or as soon after discharge as practicable, and to have made a cash settlement. The financial question would thus have been settled and the question of the payment of monthly checks of smaller or larger denomination in the future, possibly for life, would have been removed. The discharged soldier could then have received medical care where he chose, and would have had means for making himself self-supporting. From a psychological standpoint the situation would have been the same as when a personal injury suit is settled. The soldier's mind would have been diverted from his physical condition and from apprehension of the future, and he could have better applied himself to the earning of his livelihood. The application of such a policy at this late date would not be impossible and would reduce the immense expense entailed in the administration of the Veteran's Bureau, no end of which is in view.

In the Veteran's Bureau we have a good example of the operation of state medicine. The relation of patient to doctor is wrong. In many cases the examining physician for the Veteran's Bureau is confronted by an absence of definite objective symptoms and he is at a loss to come to a conclusion as to the presence of a definite disability. Subjective symptoms are of very great value in the estimation of a case and in this class of cases these are unreliable.

It is a question how many of the difficulties encountered in the administration of the activities for the care of disabled soldiers will be removed by the change in the name of the Bureau. Would not an entire change in policy be of much more value?

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### TRI-STATE DISTRICT MEDICAL SOCIETY

The Tri-State District Medical Society which covers a territory including the entire states of Iowa, Illinois and Wisconsin extends to the physicians of Minnesota a hearty invitation to attend its annual assembly which is to be held at Milwaukee, Wisconsin, November 14th, 15th, 16th and 17th. The following is a partial list of the members of the profession who have accepted places on the tentative program:

Dr. George Armstrong, Prof. of Surgery, Faculty, McGill University, Montreal, Quebec.

"Physiology and Embryology of Colonic Stasis."

Commander William Seaman Bainbridge, United States Navy, Medical Department, New York, N. Y.

"The Thyroid Gland and Intestinal Stasis."

Dr. Arthur Dean Bevan, Prof. of Surgery, and Head of Surgical Department, Rush Medical College, Chicago, Illinois.

"Tumors of the Breast."

Dr. Hugh Cabot, Dean and Prof. of Surgery, University of Michigan, Medical School, Ann Arbor, Michigan.

"A Neglected Factor in Surgical Infections."

Dr. Henry A. Christian, Hersey Prof. of the Theory and Practice of Physic, Harvard University, School of Medicine, Boston, Mass.

"The Relation that exists between Hypertension, Myocarditis, and Nephritis."

Dr. John G. Clark, Prof. of Gynecology, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

"The Anatomic Principles underlying Plastic Operations."

Dr. Charles P. Emerson, Dean and Prof. of Medicine, Indiana University, School of Medicine, Indianapolis, Ind.

"The Treatment of Chronic Nephritis."

Captain A. M. Fauntleroy, M. C., U. S. Naval Hospital, New York City.

"Hemorrhoids and Hemorrhoidectomies."

Dr. Charles H. Frazier, Prof. of Neurosurgery, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

"The Problem of Intra Cranial Surgery relating to Brain Tumors."

Dr. J. Claxton Gittings, Prof. of Pediatrics, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

"A Disease in Childhood which commonly is unrecognized."

Dr. William P. Graves, Prof. of Gynecology, Harvard University, School of Medicine, Boston, Mass.

"Role of Ovary in Pelvic Surgery."

Professor H. C. Jacobaeus, Serafiner Hospital, Stockholm, Sweden.

"The Thoracoscopy and its practical use."

Dr. Warfield T. Longcope, Bard Prof. of the Practice of Medicine, Columbia University, College of Physicians and Surgeons, New York, N. Y.

"The Affect of Occlusion of the Coronary Arteries on the Heart's Action and its Relationship to Angina Pectoris."

Dr. John P. Lord, Prof. of Orthopedic Surgery, University of Nebraska, School of Medicine, Omaha, Nebraska.

"Grafts of Whole Substance Bone."

Dr. Willis F. Manges, Prof. of Roentgenology, Jefferson Medical College, Philadelphia, Pa.

"Foreign Bodies in the Air Passages from the Viewpoint of the Roentgenologist."

Dr. Franklin Martin, Chicago, Illinois.

"The Program of the American College of Surgeons."

Dr. William J. Mayo, Mayo Clinic, Rochester, Minnesota.

"The Surgical Aspects of Diverticulitis of the Colon" (lantern slides).

Dr. Thomas McCrae, Prof. of Medicine, Jefferson Medical College, Philadelphia, Pa.

"Fundamentals in Medicine."

Dr. Joseph A. Pettit, Prof. of Surgery, University of Oregon, School of Medicine, Portland, Oregon.

"Surgical Aspects of Uterine Malposition."

Dr. Reginald H. Sayre, Prof. of Orthopedic Surgery, University and Bellevue Hospital, Medical College, New York, N. Y.

"Errors in Orthopaedic Diagnosis."

Dr. Alfred Stengel, Prof. of Medicine, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

"Type and Treatment of Severe Anemia."

Dr. J. Bentley Squier, Prof. of Urology, Columbia University, College of Physicians and Surgeons, New York, N. Y.

Dr. Frederick Tice, Prof. of Clinical Medicine, University of Illinois, College of Medicine, Chicago, Illinois.

Dr. Henry Enos Tuley, Dean and Prof. of Pediatrics, University of Louisville, School of Medicine, Louisville, Ky.

"Some Aids to Diagnosis in Medicine."

Professor De Quervain, Berne, Switzerland.

The Central Minnesota Medical Association held their regular summer picnic meeting at Green Lake on Thursday, September 1st. An interesting scientific program was presented during the afternoon. Papers were presented by Drs. Verne S. Cabot and G. R. Matchan, of Minneapolis; Drs. B. J. Branton and H. V. Hanson, of Willmar, and Dr. S. C. Scofield, of Benson.



## NEWS OF THE HOSPITALS

The new Northern Pacific Hospital, St. Paul, which is one of the most complete in the Northwest, and occupies an entire city block, is now open. The building is fireproof throughout and is composed of four floors. The ground floor contains the main kitchen and all necessary supply rooms, the administration staff, x-ray, eye, ear, nose and throat department, laboratory and drug dispensary, and the large main dining room. The second floor is known as the medical floor. The third floor, which is the surgical floor, is used exclusively for patients and contains a complete suite of operating rooms. Both the second and third floors have large wards, besides a number of single rooms. There are large sun parlors leading off each ward. The fourth floor is entirely made up of single rooms for special cases. Dr. A. W. Ide, who has been chief surgeon of the association hospital at Brainerd, will be chief surgeon of the new hospital. A school of nursing will be operated in connection with the institution, which school has been affiliated with the University of Minnesota.

With the removal of the Northern Pacific Hospital to St. Paul, the Northern Pacific Beneficial Association has opened offices in the First National Bank Building, of Brainerd, with Dr. B. I. Derauf in charge. The Association has made arrangements with the Northwestern Hospital and with St. Joseph's Hospital at Brainerd to care for employees in need of emergency hospital service.

Dr. S. A. Slater, superintendent of the Southwestern Minnesota Sanatorium, of Worthington, has been chosen president of the Minnesota Tuberculosis Association. Dr. Slater has recently published the first report of the Sanatorium, which report comprises a sixteen page pamphlet.

## OBITUARY

C. S. Reimstad, M. D., Brainerd, Minn. Born in Norway, June 26, 1867. Graduate of University of Minnesota. Died August 28, 1921.

Elmer E. Barrett, M. D., Glencoe, Minn. Born in New Hampshire, August 10, 1862. Graduate of Cushing Academy, Ashburnham, Mass. in 1883. Died August 9, 1921.

## OF GENERAL INTEREST

Dr. A. H. Kegel, of the Mayo Clinic, has moved to Chicago, where he will open an office for the practice of surgery.

Dr. H. T. Sherman, of Franklin, has purchased a hotel building at that place and will convert it into a hospital in the near future.

Roosevelt, Minnesota, is without a physician. This is a very prosperous community and should be a splendid opening for a young physician.

Dr. H. G. Blanchard, of Waseca, who has been spending the past year in California, will return to resume his practice with Dr. Henry Miller.

Dr. J. A. Roy, who left Argyle about a year ago to practice medicine at Stephen, has returned to Argyle and will resume his practice at that place.

Dr. Moses Barron, of Minneapolis, announces the opening of a clinical, chemical and pathological laboratory under his supervision at 309 Physicians and Surgeons Building.

Dr. O. F. Mellby, of Thief River Falls, has returned from Chicago where he spent several weeks in the study of diseases of the eye, ear, nose and throat, in which he will specialize in the future.

Dr. Verne S. Cabot, of Drs. Willson, Cabot & Wohlrabe, 323 La Salle Bldg., Minneapolis, sailed for Vienna on September 10th, where he will spend the winter doing special work in surgery.

Dr. Ellsworth Johnson, of Windom, who has been doing hospital work in New York City for the past two years, has returned and will be associated in the practice of his profession with Dr. Sogge, of that place.

Dr. L. N. Klove, of Chokio, who has been practicing medicine at that place for the past three years, has moved to Kensington, Minnesota, where he will reside in the future. The departure of Dr. Klove leaves Chokio without a physician.

Dr. J. L. Adams, of Morgan, who sold his practice the first of the year to Dr. J. L. Haskins and moved to California, has returned to Minnesota and has purchased the practice of Dr. C. C. Walker of Lamberton. Dr. Walker is locating at Raymond.

Dr. F. A. Drake, of Lanesboro, has taken Dr. Rolf F. Nannestad, of Albert Lea, into partnership. Dr. Nannestad is a graduate of the University of Minnesota Medical School, and since his graduation he has been an interne at various large hospitals.

Drs. F. H. Dubbe, O. C. Strickler and W. J. Von Bank, of New Ulm, have formed a clinic which will occupy the entire second floor of the Farmers and Merchants State Bank Building. Drs. Dubbe and Strickler will devote their time to medicine and

surgery, while Dr. VonBank will have charge of the dental department of the clinic.

Dr. Shedlov, of Gully, is temporarily in charge of Dr. A. W. Swedenburg's practice at Thief River Falls. Dr. Swedenburg is in Minneapolis where he is taking a post-graduate course, after the completion of which he will return to Thief River Falls.

Dr. F. J. Brabec, of Fergus Falls, has become associated with Dr. H. M. Juergens, in the practice of medicine and surgery. Dr. Juergens is a graduate of the University of Minnesota Medical School and has served in various hospitals since his graduation.

Dr. W. S. Broker, who has been superintendent of the Otter Tail County Sanatorium at Battle Lake for several months, has received an appointment to the Public Health Service at Minneapolis. Dr. W. Berry, of Massachusetts, will succeed Dr. Broker at Battle Lake.

Dr. Frederick E. B. Foley is associated with the Miller Clinic of St. Paul, as urologist. After graduating from the Johns Hopkins Medical School in 1918 he spent another year under Dr. McCallum doing pathology. The following year he spent in the Surgical Research Laboratory of the Harvard Medical School, after which he was a house officer in the Peter Bent Brigham Hospital under Dr. Cushing.

Our national Congress this summer amended the Volstead act in such a way that "only spirituous and vinous liquor may be prescribed for medicinal purposes." This means that beer cannot be prescribed. Vinous liquor containing over 24 per cent alcohol is also prohibited. Also, physicians are not permitted to prescribe more than a quart of vinous liquor or any liquor that contains more than one half pint of alcohol for any person within the ten-day period. A limitation of 100 prescriptions for any physician for each three months is also imposed. Because of a difference of opinion between the Senate and House regarding the right of search on warrant the bill was aid over until the reassembling of Congress, but Secretary Mellon has refused to issue regulations, allowing the prescribing of beer by physicians. It is likely that the amendment will be passed soon after the opening of Congress.

## PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

*Cases Presented at the Meeting Held May 1, 1921*

**Dr. E. L. Tuohy, Duluth, Minn.** Specimen of lung showing massive collapse of the lower lobe; death due to massive collapse occurring on both sides.

Male, aged 48. Family history negative.

**Past History**—In 1915 an acute attack, said to have been appendicitis. Later examination indicated to the clinicians that he had in addition chronic cholecystitis. More or less indigestion, supposed to be of that source, until December 1920, when he had a decisive duodenal hemorrhage. After recovery with medical treatment, the roentgen evidence showed definite duodenal defect—deep, and indicating penetration. Symptoms continued despite reasonable treatment.

**Pre-operative diagnosis**—Chronic appendicitis; duodenal ulcer; cholecystitis.

**Operation**—Dr. T. L. Chapman, April 26, 1921. Gas-oxygen anesthetic. The appendix was found massed in adhesions in the right iliac fossa; a large duodenal ulcer on the upper and posterior wall of the duodenum, with some external adhesions in the region of the gall-bladder. The appendix was removed, the ulcer area turned in, with continuous catgut stitches, and a posterior gastroenterostomy done. (He took the anesthetic badly, and artificial respiration had to be resorted to near the end. There was considerable mucus in the throat.)

**Convalescence**—Immediately stormy, with early moderate rise of temperature, dyspnea, rapid increase in pulse rate, mounting finally to 160, and finally uncountable. On the second day, auscultation of the lungs showed marked tubular breathing over both bases posteriorly; on the following day rales were added. There was frothy mucous expectoration, quite scant; never any blood. Patient was extremely irritable, restless and fearful. Stimulation of various kinds had only temporary benefit. Dullness, approaching flatness, supervened over both bases.

**Pre-autopsy Diagnosis**—Massive collapse, bilateral, of lungs.

**Autopsy**—Partial autopsy permitted. Abdominal condition perfectly clean. Lungs removed through opening made in the diaphragm. A large portion of the lower lobe on each side perfectly collapsed. On section, no air, blood, or pus.

**Discussion**—This condition of massive collapse is discussed chiefly in the literature of the English physicians and surgeons. It was first considered to follow post-operative laparotomy.

Elliott & Dingley (London Lancet, p. 1305, May 9, 1914) summarized and called attention to the original description of Dr. W. Pasteur. These men





reported in all, 11 cases, drawing attention to the clinical resemblance to post-operative lobar pneumonia, and concluding that the condition was occasioned by muco-purulent plugging of considerable sized bronchi. Fixation of the diaphragm and various mechanical physiological disturbances were analyzed.

Chapter IV, Oxford Series, p. 127, article by Sir John Rose Bradford, draws attention to the prevalence of this condition as shown in association with various war wounds, not necessarily penetrating nor severe, and wide in their original distribution. In a word, calling attention to this traumatic and post-operative complication, and giving one the impression that it follows certain of these states very much as acute dilatation of the stomach or acute ileus occurs.

The condition is usually not fatal, and this patient probably died because it was bilateral.

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**Dr. Wm. Lerche, St. Paul:**

Female, aged 34 years. Four times between 1910 and 1919 large clusters of lymph nodes were removed by me from her left supra-clavicular space. In 1919 large masses of lymph nodes were removed from her right supra-clavicular space.

The present trouble began two months ago with gradually increasing hoarseness and dyspnea on slight exertion. Dyspnea worse when she lies on the right side. Dullness over upper half of right thorax extending to the left of the sternum. Leucocyte count 11,000 to 12,000.

Radiogram shows large mediastinal tumor extending into the right pleural cavity.

Anterior mediastinotomy with removal of part of tumor. Microscopic section shows a form of Hodgkin's disease classified as number 3 by Ziegler.

Since 1916 we have three different types of glands removed from this patient. It is not easy to make a differential diagnosis between these mediastinal affections.

Case 2. Posterior mediastial abscess. Male age 30. The patient had had a retropharyngeal abscess, which had been incised by his physician. Later high temperature, 104°. Examination revealed emphysema of the neck, and radiogram showed a large mediastinal shadow. The posterior mediastinum was opened through an incision along the anterior border of the right sternocleidomastoid muscle. Drainage tube extended to 5½ inches below top of sternum. Leucocyte count about 15,000.

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**Dr. J. C. Litzberg, Minneapolis:**

1. I would like to report a case of myoma in pregnancy. Myomectomy in the pregnant uterus is not necessary in all cases. The location of the fibroid has more to do with the question as to whether or not an operation should be done. This patient I had known for several years before her marriage. She

had consulted me about 3 years before marriage and in the course of the examination I found small fibroids in the uterus, one about the size of an egg and another about the size of a walnut. Three years later she married and became pregnant. When she came to my office at this time I found the fibroid had grown greatly in size, filling about half the pelvis, and located in such a manner that she would not be able to give birth to the baby. She was loath to have the uterus emptied and we finally decided to perform a myomectomy. The large fibroid was difficult to get at; it was very low in the pelvis and very low in the uterus. We operated very promptly hoping we would be able to operate without abortion. Four other fibroids were removed at the same time.

The operation was done three weeks ago, and for a while the patient had some pains. She has not aborted, however; three weeks have passed by and I think we can call this a successful operation.

2. The other case I have to report is simply a curiosity. The case was referred to me for routine examination of the pelvis. The woman, about 42 years of age, had never menstruated. On examination she was found to have no cervix, the vagina being simply a blind sac. No evidence of cervix on speculum examination either. It is supposed that she has no uterus; at least we felt that she had no functioning uterus because she is a woman 42 years of age and if the uterus had been functioning naturally we would expect to find a uterus distended with menstrual blood. She has the usual sexual feelings and possesses all the maternal instincts for she has adopted and raised three children.

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**Dr. A. E. Benjamin, Minneapolis:**

1. I would like to report a case similar to Dr. Litzberg's first one. I operated recently on a doctor's wife who had had several miscarriages and abortions. She would go 2 or 3 months and abort, and had on one occasion gone on to 7 months. She was then about 35 years of age and wished very much to have this child. She was 7 months along when I saw her, and was beginning to have some pains. On examination she was found to have a fibroid low down in the uterus on the right side and very tender. Inasmuch as she had gone 7 months we decided to operate. We found a fibroid as large as my fist, soft and somewhat adherent. We removed this very carefully and she went on to term and had the child.

2. Strange to say I have another case at the present time similar to Dr. Litzberg's second case. General Hospital case, young woman 26 years of age, has never menstruated. External genitalia practically normal, also cervix and os, but no uterus excepting a small canal 1½ inches in length. She has no ovaries that we can make out. There is very little growth of hair upon the pubes and very little under the arms. She has the build of a male.

**Dr. S. Marx White, Minneapolis:**

I would like to report a series of cases of considerable interest; the series of paratyphoid cases occurring among the students at the University of Minnesota.

In all there were 86 cases reported. When the epidemic was discovered an epidemiological investigation by the State Board of Health brought out the fact that all (except 4 cases) had had dinner at the Minnesota Union and had had milk on the 13th of March. There were very definite gastrointestinal symptoms beginning within two or three days after ingestion of the milk. Some cases were seen in the students' health service. Blood cultures were not made before the appearance of rose spots. After about 10 days of these indefinite gastrointestinal symptoms several cases almost simultaneously showed rose spots. The Widal reactions began to show positive for paratyphoid and not typhoid. Cultures were made from the blood after the appearance of rose spots in some of the cases, but as bacilli disappear early from the blood in paratyphoid only one culture was successful. In nearly 30 cases cultures were made from stool and bacillus paratyphosus beta found. Thirty of the cases went to hospitals. The remainder of the cases were scattered as the students had gone into different parts of the state for vacation. Two deaths were reported. One autopsy was made and showed extensive lesions in the colon, more abundant in the cecum and a few small ulcers in the ileum. The other student who died had gone to his home in the southern part of the state and on development of symptoms was thought to have appendicitis, was operated and died subsequently.

The clinical features were interesting. The general outline was that of a mild type of typhoid. The very remarkable and extensive distribution of the rose spots was unusual. In many cases they were found on the thighs, arms, and wrists, as well as over the trunk. Four cases showed rose spots on the face. One boy had a tremendous papular eruption over the back. Enlargement of the spleen was found in only 2 cases out of 14 we had at the University Hospital. Otitis media developed in 2. Nervous symptoms were not marked. One patient had rather toxic nervous symptoms typical of typhoid. Other than that the course was uneventful. One case still shows symptoms suggestive of the so-called typhoid spine. There was a singular absence of complications.

**Dr. R. E. Farr, Minneapolis:**

I would like to refer to one of these cases that came to St. Mary's Hospital. He had much the same symptoms that Dr. White mentions and it is very interesting to note that a physician from South Dakota, when he saw one of these boys, asked me what intestinal influenza was. This apparently was what he used to call typhoid.

One of these boys had a double otitis media and

was the only one who was severely ill. About the end of the second week with the double otitis he developed severe abdominal cramps during the night. He was doubled up, face pale, sweating, and we were quite alarmed about him. He had very slight rigidity in the region of the appendix and no change in the pulse rate. The leucocyte count which had been around 2,500 jumped to about 8,000 early in the morning and at noon was 7,000. I operated on him under local anesthesia at 1 o'clock. He had a large thickened appendix which I thought might be a mild acute appendix. I also thought of perforation and went over the intestinal tract from one end to the other and found the intestines normal. He showed no pathology along the intestinal tract. He surely had a crop of "rose spots."

**Dr. Braasch**, of Rochester, read a thesis entitled "Atrophic Pyelonephritis." Lantern slides were shown.

**DISCUSSION**

**DR. HEAD:** I would like to ask Dr. Braasch whether there is a large amount of pus in the urine or whether in general the amount of pus is small. Does the appearance of the urine suggest a large deposit of pus as it sedimentates?

**DR. BRAASCH:** The rule is to find considerable pus but of these that were atrophic the majority of them had only a moderate number of cells—10 to 12—to the field. We had 3 cases of perfectly negative urine. Three things are taken into consideration in making a diagnosis: 1—history of unilateral pain, frequent dysuria, temperature and cells; 2—absence of function; 3—the pyelogram.

**DR. FARR:** I was very much interested in Dr. Braasch's paper and want to ask him in what percentage of cases he would find a dead kidney large and perhaps full of pus. I had a case of a woman aged 68 with infection of the left kidney with practically complete loss of function of that organ. On the right there was hyper-function, and the ureterogram showed no shadow of the kidney substance. She had a kidney twice the size of a normal kidney and full of pus. In what percentage of cases have you found a large kidney rather than this atrophic type?

**DR. BRAASCH:** I dare say that error could easily be made in diagnosis. I recall possibly half a dozen similar instances. The main thing is to make a diagnosis of surgical kidney.

**DR. TUOHY:** Were the phenolsulphonephthalein injections made intravenously?

**DR. BRAASCH:** Yes.

**DR. DENNIS:** Do you end the experiment in 15 minutes?

**DR. BRAASCH:** Usually.

**Dr. Geo. D. Head**, of Minneapolis, read a paper entitled "Acute Arteritis complicating Pneumonia."

HARRY P. RITCHIE, Secretary.



## NEW AND NON-OFFICIAL REMEDIES

The following additional articles were accepted during June:

**Lederle Antitoxin Laboratories:**

**Pollen Antigen-Lederle (Ragweed)**

**Pollen Antigen-Lederle (Timothy)**

During July the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

**The Abbott Laboratories:**

**Argyn.**

**Hoffman LaRoche Chemical Works:**

**Papaverine Sulphate Tablets-Roche.**

**Nonproprietary Articles:**

**Casein.**

During July the following articles have been accepted:

**Beebe Laboratories, Inc.:**

**Beebe Protein Milk.**

**Beebe Modified Buttermilk.**

### PROPAGANDA FOR REFORM

**Mode of Action of Some Common Laxatives.**—Calomel has been currently represented to act by promoting the secretion and retarding absorption, so that an accumulation of the abundant fluid and the consequent evacuation of the semisolid contents ensues. However, a recent investigation in the Pharmacologic Institute in the University at Utrecht by Van der Willigen indicates that absorption in the gastro-intestinal canal is not interfered with in the presence of calomel, and that the drug functions by promoting more vigorous movements of the small and large intestine whereby the contents are propelled so rapidly toward the rectum that absorption and the production of formed stools cannot take place. Similarly, Van de Willigen found that phenolphthalein does not retard absorption nor produce secretions in undue quantities, but acts by promoting peristalsis so that the fluid contents are driven into the proximal colon more rapidly than under normal circumstances. It has been claimed that the laxative action of sulphur is due to the formation of sulphurous acid, which causes irritation of the bowels. In contrast with this is the finding of hydrogen sulphid in the lower small intestine and upper large bowel after the ingestion of sulphur. Van der Willigen believes that ordinarily the chyme which discharges from the small intestine into the colon is soon concentrated there by the rapid absorption of water, but that when hydrogen sulphid is formed from the ingestion of sulphur, it promotes the more rapid passage of the semifluid contents beyond the colon, so that the usual concentration cannot take place (Jour. A. M. A., Aug. 6, 1921, p. 468).

**Distribution of Vitamins.**—Our knowledge of the

accessory food factors, commonly spoken of as vitamins, is so recent, and the exact nature of these factors so enveloped in mystery, that it was inevitable that the public's lack of knowledge on the subject should be capitalized. It, therefore, is not surprising that there are on the market a number of "patent medicines" that are sold under the claim that they are rich in vitamins—although their exploiters fail to explain which, if any, of the three food factors their products contain. The renaissance of yeast as a therapeutic agent has given an opportunity to the manufacturers of this product of unduly stressing the fact that yeast is rich in antineuritic vitamin (water soluble B). Because milk and certain milk products are rich in the fat soluble A factor, the dairy interests would apparently have the public believe that this particular vitamin is to be obtained only from their products. The truth is, that the accessory food factors are so well distributed throughout the dietary of modern man that, generally speaking, the individual who uses ordinary judgment in selecting his food is in no danger of suffering from a deficiency of any of these three factors (Jour. A. M. A., Aug. 13, 1921, p. 561).

**Bacillus Acidophilus.**—Metchnikoff, who believed that poisons of putrefactive origin were detrimental to human well being, attempted to modify the intestinal flora by the administration of viable lactic acid bacilli in the form of *Bacillus bulgaricus*. The best scientific evidence indicates, however, that this bacillus is incapable of accommodating itself to intestinal conditions. On the other hand, it has been shown that a related bacillus, *Bacillus acidophilus*, which is actually of intestinal derivation, lends itself to implantation in the intestinal canal. Further, abundant growth of this bacillus may be secured by appropriate change in the diet, namely, by the administration of lactose (milk sugar) and dextrins. That this change in the flora may thus be produced is explained by the normal presence, though in small number, of *B. acidophilus* in the intestine which requires only the stimulus of a favorable medium. Whether there are special conditions under which the implantation of *Bacillus acidophilus* is beneficial remains to be learned, and the findings should not be hastily translated into a new sour milk cult (Jour. A. M. A., Aug. 20, 1921, p. 626).

**The Schick Test.**—The Schick test for determining the degree of immunity to diphtheria is no longer a novelty. Many of those giving a positive reaction have been successfully immunized in the face of impending danger. Park of the New York Board of Health asserts that a negative Schick test in cases in which there is active immunity, either natural or acquired, when the toxin used and the technic employed have been suitable, gives an almost complete security from diphtheritic disease, not only for the immediate time but also for the future (Jour. A. M. A., Aug. 27, 1921, p. 708).

# Minnesota State Medical Association

## ANNUAL MEETING

August 24, 25 and 26, 1921

DULUTH, MINNESOTA

MINNESOTA STATE MEDICAL ASSOCIATION  
MINUTES OF THE FIFTY-THIRD ANNUAL  
MEETING HELD AT DULUTH, AU-  
GUST 24, 25 and 26, 1921

### PROCEEDINGS OF THE HOUSE OF DELEGATES

#### FIRST SESSION—WEDNESDAY, AUGUST 24, 1921

The House of Delegates met in the sun parlor of the Spalding Hotel, and was called to order by the President, Dr. C. Eugene Riggs, St. Paul, at 2 p. m., who said: The first order of business is the appointment of a committee to pass on the credentials of the delegates. The Chair will appoint as committee on credentials Drs. R. J. Hill, F. J. Savage, and O. W. Parker.

While this committee is investigating the delegates we will proceed with our business, because we have enough matters to occupy our attention this afternoon.

We will listen to the reading of the minutes of the last meeting.

THE SECRETARY: The minutes of the last annual session were published in full in the December issue of MINNESOTA MEDICINE. Is it the wish of the House of Delegates that these minutes be read?

DR. E. M. CLAY: I move that the reading of the minutes of the last annual session be dispensed with. Seconded by Dr. G. S. Wattam and carried.

THE PRESIDENT: A motion is in order to accept them without being read.

DR. J. G. CROSS: I think some of the committees mentioned in the minutes of the House of Delegates last year can be read later on, if necessary, by a special motion, even though the minutes have been accepted.

THE PRESIDENT: Yes, you can do that.

DR. WATTAM: I move that the minutes be accepted.

Seconded and carried.

THE PRESIDENT: I desire to announce that a quorum is present, the House is organized, and now ready for the transaction of its business.

The next order will be the Report of the Council.

The Secretary read the report of the Council as follows:

#### REPORT OF THE COUNCIL

August 24, 1921

The Council met at 10 a. m., and a committee was appointed which audited the report of the Treasurer:

It was decided by the Council that in the future it would be consistent with the practice in other associations for the Association to care for the local accommodations for visitors and for attendance at the banquet, but not to offer to provide transportation for such visitors.

Action on the request of Dr. J. J. Ratcliffe, Secretary of the Aitkin County Society, that their charter be revoked, was deferred and the matter was referred to the Councilor of the Second District, Dr. Millspaugh.

The Council recommended the continuation of the Committee on Collection and Publication of the Papers of the late Dr. Tomlinson for another year, as requested by the chairman of that committee, Dr. A. F. Schmitt.

The report of the Editing and Publishing Committee of the Journal was adopted and it was moved and seconded that the publishing and editing forces be congratulated on the financial showing of the year.

Proposition for the assumption of the collection of bad accounts by the State Association office was submitted by the executive secretary, Mr. J. R. Bruce, and it was moved that Mr. Bruce put the proposition in writing and the question be brought up at the adjourned meeting of the Council to be held Friday morning at 9 o'clock.

The reports of the Secretary and Attorneys were read and adopted.

The Council has one recommendation to make to the House of Delegates, that is, that the Reference Committee System outlined in the Report of 1920 before the House of Delegates by Dr. George D. Head, Chairman of the Committee, be adopted. This system will be presented in the final report of this committee at this session of the House of Delegates.

THE PRESIDENT: The report of the Council is before you, as read by the Secretary.

DR. WATTAM: I move that the report be accepted and adopted.

Seconded and carried.

THE PRESIDENT: The next order of business is the report of the Secretary.

The Secretary presented his report as follows:

#### REPORT OF THE SECRETARY

The Minnesota State Medical Association opens its Fifty-third annual meeting with the largest paid membership in the history of the Association, having



gained 101 paid memberships during the year making a total of 1644.

Acting upon a recommendation made at the 1920 meeting, the Council arranged for an executive secretary to relieve the general secretary of a very large portion of the detail work in connection with the activities of the organization.

The new arrangement of combining the activities of the office of the secretary and the management of the journal has now been in operation almost eight months. The details of the work of both the Association and MINNESOTA MEDICINE have been carried out in the office of the executive secretary, Mr. J. R. Bruce. In my judgment the work has been handled in a very satisfactory manner.

The office of the executive secretary encountered many difficulties during the early part of the year, as no one in connection with the office was, prior to January 1st, 1921, familiar with the details of any of the work connected with the Association activities or of MINNESOTA MEDICINE editorial work.

A card index of the membership has been prepared which provides a very complete record of the membership of each individual. This new system eliminates the transcribing of the total membership of the societies each year.

This year the Minnesota legislature was in session, which required considerable activity on the part of the Committee on Public Policy and Legislation. It was undoubtedly due to the very efficient work of this Committee that no unfavorable legislation was enacted during the session. The details of the work will be explained in the report of the chairman.

The entire membership of the Association has been circularized six times in connection with the activities of this committee and upon other subjects. This is only the beginning of what is planned as constructive work in increasing the value of the Association to its members and adding to its membership. It is believed that keeping in close touch with the Association members, not only at convention time, but throughout the year serves to enliven the interest of each member of his Association and keeps him informed of the activities of the organization in his behalf.

It is planned to undertake a systematic method for increasing the Association membership by obtaining the names of desirable physicians from the officers of component societies and bringing pressure to bear upon these men to affiliate with their local societies. The cooperation of each individual member in this work will be very greatly appreciated and of valuable assistance.

Our membership by component societies as of record August 18th, 1921, is as follows:

|                                  |     |
|----------------------------------|-----|
| Aitkin County .....              | 7   |
| Blue Earth County .....          | 26  |
| Blue Earth Valley .....          | 23  |
| Camp Release .....               | 47  |
| Carlton County .....             | 8   |
| Central Minnesota District ..... | 11  |
| Chisago-Pine .....               | 15  |
| Clay-Becker .....                | 24  |
| Dodge County .....               | 8   |
| Freeborn County .....            | 15  |
| Goodhue County .....             | 13  |
| Hennepin County .....            | 386 |
| Houston-Fillmore .....           | 24  |
| Kandiyohi-Swift .....            | 15  |
| Lyons-Lincoln .....              | 17  |
| McLeod County .....              | 10  |
| Meeker County .....              | 12  |
| Mower County .....               | 26  |
| Nicollet-LeSueur .....           | 18  |

|                              |     |
|------------------------------|-----|
| Olmsted County .....         | 100 |
| Park Region .....            | 42  |
| Ramsey County .....          | 273 |
| Redwood-Brown .....          | 19  |
| Red River Valley .....       | 54  |
| Rice County .....            | 22  |
| St. Louis County .....       | 140 |
| Scott-Carver .....           | 16  |
| Southwestern Minnesota ..... | 56  |
| Stearns-Benton .....         | 39  |
| Steele County .....          | 14  |
| Upper Mississippi .....      | 69  |
| Wabasha County .....         | 13  |
| Waseca County .....          | 9   |
| Washington County .....      | 13  |
| Watonwan County .....        | 8   |
| West Central Minnesota ..... | 17  |
| Winona County .....          | 22  |
| Wright County .....          | 13  |

Total .....1644

The secretary reports receipts from the above societies from

|                                     |            |
|-------------------------------------|------------|
| Oct. 1, 1920, to Aug. 18, 1921..... | \$8,220.00 |
| Back Dues .....                     | 224.00     |
| One advance payment of 1922 dues..  | 5.00       |

Total .....\$8,449.00

The total receipts of the Association from September 18, 1920, to August 18, 1921, from all sources, amounted to \$16,319.67. The total disbursements of the Association for the same period amounted to \$14,263.49. Leaving a net surplus for the year of \$2,056.18.

It is believed that the executive secretary's office is in a position to add to its usefulness to the Association by opening a department for the collection of bad accounts, charging a fee only sufficient to cover the cost of the services. If this suggestion is approved by the Council and House of Delegates we believe that this work can be very satisfactorily handled, and that it should result in considerable saving to those members availing themselves of this facility.

THE PRESIDENT: What is your pleasure with reference to this report of the Secretary? The Secretary makes the suggestion that after the House of Delegates is organized, these reports can be accepted and adopted, and perhaps that is the best mode of procedure.

Is the Committee on Credentials ready to make its report?

DR. R. J. HILL: There are two or three questions your Committee want to inquire about. We have three representatives here apparently from Olmstead county. Dr. Witherstine is not represented. This county is entitled to two delegates. There is but one delegate assigned to this county, Dr. Witherstine.

In regard to Red River Valley County, H. E. Nelson takes the place of O. F. Melby. Dr. Nelson is the alternate of Dr. Melby, who is absent. The Secretary recommends that Dr. Nelson be given the proper credentials so that he can be seated. On this list only one delegate has been assigned to represent Olmstead county, although the Secretary informs me they are entitled to two delegates. (Dr. Hill then read a list of delegates who had registered and were entitled to be seated as delegates). Dr. A. H. Logan and Dr. H. G. Giffin, of Olmstead county, were seated as delegates.

THE PRESIDENT: You have heard the report of the Committee on Credentials. What is the pleasure of the House?

DR. J. C. ROTHENBURG: I would like to say that I am a delegate from the new Redwood-Brown

County Medical Society, and forgot to bring my credentials.

THE PRESIDENT: A motion with reference to this matter will clear it up nicely.

It was moved and seconded that Dr. Rothenburg be seated. Carried.

THE PRESIDENT: The report of the Treasurer is next in order.

#### REPORT OF TREASURER

Annual statement of the Treasurer covering period, September 20, 1920, to August 20, 1921

##### RECEIPTS

|                                   |             |
|-----------------------------------|-------------|
| Minnesota Medicine .....          | \$10,924.94 |
| Membership Dues .....             | 8,449.00    |
| Interest-Bonds and balances.....  | 233.73      |
| Bonds .....                       | 4,000.00    |
| Cash on hand, Sept. 20, 1920..... | 2,435.42    |
|                                   | <hr/>       |
|                                   | \$26,043.09 |

##### DISBURSEMENTS

|                                  |             |
|----------------------------------|-------------|
| Minnesota Medicine .....         | \$10,424.26 |
| Dr. Drake, Office Exp.....       | 153.90      |
| Salaries .....                   | 1,160.60    |
| Legal Expense .....              | 1,250.21    |
| Bonds .....                      | 4,000.00    |
| Sundries .....                   | 4,562.52    |
| Cash on hand, Aug. 20, 1921..... | 4,491.60    |
|                                  | <hr/>       |
|                                  | \$26,043.09 |

August 18, 1921

THE PRESIDENT: The next is the report of the Attorneys of the Association, which will be read by the Secretary.

The Secretary read the following report:

#### REPORT OF ATTORNEYS

Dr. Carl B. Drake,  
Secretary,  
Minnesota State Medical Association,  
Saint Paul, Minnesota

Dear Doctor Drake:

You have requested it, and we make report to the Association covering the work done by us during the year last passed:

*Kilbride et al vs. Beacher:* This action was brought by Drs. J. S. Kilbride and L. J. Holmberg, practicing at Canby, Minnesota, to recover their professional fees in the care and treatment of Bertha Beacher who had been operated on in the hospital at Canby. While under an anesthetic she received burns from the hot water bags, counterclaimed in the suit for fees, alleging negligence of the doctors causing the burns. The case was brought on for trial and we procured a dismissal on the merits and judgment for the professional fees.

*Miner vs. Helland:* This action is brought to recover damages on account of alleged malpractice of Dr. G. M. Helland, Spring Grove, Minnesota, in reducing a fracture. The case had rather a protracted history on the right to bring in Dr. M. S. Nelson as a party defendant together with Dr. Helland, on the claim that the doctors were copartners at the time of the alleged malpractice, although Dr. Nelson had nothing to do with the case. The court finally held that Dr. Nelson was a proper party defendant, and the case stands for trial at the December 1921 term at Caledonia.

*Krueger vs. Bossingham* (2 cases). *Singer vs. Bossingham* (2 cases): These cases are pending in the District Court of Lincoln county, and involve the alleged malpractice of Dr. O. N. Bossingham, Lake Benton, in obstetrical cases. We tried the Singer case in September 1920 and secured a jury verdict,

but the court granted a new trial by reason of a technical error in the charge. A motion to reconsider the order of the court granting the plaintiff a new trial, is pending with the result that the case likely is on its way to the Supreme Court. The item is a very serious one, and as noted, we have successfully defended it to date, getting a jury verdict but the court has granted a new trial. The plaintiff in the case is Pearl Singer and the companion case is brought by the husband, arising out of the same disability for his expenses and the loss of services of his wife.

In the Krueger case the woman died from Septicemia following childbirth. The case was tried in March 1921 with the result that a verdict was rendered against Dr. Bossingham in the sum of \$5000. Mrs. Krueger left surviving her, a husband and eight children. We have ordered a transcript of the testimony and a motion for a new trial has been argued but no decision has as yet been rendered, with the result that the matter is still pending. We feel that we have an even chance of securing a new trial. The case has many untoward circumstances. Dr. Workman was a witness in the case and rendered valuable assistance to the defense. The companion case is by the husband for his disbursements and the loss of services of his wife from the time of illness to her death. All these cases may stand for retrial at the September term at Ivanhoe.

*Hanson as Administrator vs. Schultz et al:* This action is pending in Hennepin county and is brought against Dr. Frederick W. Schultz and Dr. F. H. Poppe and the Asbury Hospital to recover damages on account of the death of Lillian Hanson, a child, following an operation for pleural empyema.

*Hogan vs. Kohler et al:* This action is pending in Hennepin county and is brought to recover damages against Dr. Geo. A. Kohler and Dr. G. W. Kirmse for alleged malpractice in a mastoid operation and the treatment thereof. The case appears to be one of unusual importance. The pleadings are closed and the case is for trial some time before January 1, 1922.

*Legislative Hearings:* Some bills were proposed at the instance of the Fort Wayne Medical Protective Association relieving against the law of privileged communications and also making two years the period of time within which an action in malpractice might be brought against a physician and surgeon. There was favorable action taken by the House Committee, but the Senate Committee thought there should be no discrimination in favor of physicians and surgeons, as to the time within which actions might be brought against them, the period being in other cases, six years, and the Senate Committee thought also that the present law should remain respecting privileged communications.

*Conferences with Secretary:* There have been several conferences with the Secretary, Dr. Carl B. Drake, regarding matters of interest to the Association.

*Youngren vs. Flower:* This action was brought in Ramsey county to recover damages on account of the alleged malpractice of Dr. W. Z. Flower in reducing a compound comminuted fracture of the tibia and fibula into the ankle joint. The case was brought on for trial and we procured a dismissal on the merits.

*Seifert et al vs. Minnesota State Medical Association:* This action is brought by Drs. Seifert and Graysteen and others similarly situated, members of the Brown-Redwood County Medical Association to annul the revocation of the charter of said Medical Society and the alleged wrongful suspension of the members, and to require a reinstatement of the char-



ter and the memberships. The action is pending and will be heard by the District Court of Ramsey county on September 17th, or later date to be agreed on.

It is to be noted that all actions have been successfully defended with the exception of one, and there seems to be an even chance to relieve against the adverse verdict in that case.

Yours very truly,

MOORE, OPPENHEIMER, PETERSON & DICKSON,  
Per G.W.P.

DR. J. F. CORBETT: I should like to ask whether there is any real system is auditing the accounts of the Association. Have these accounts been verified by some auditing company?

THE PRESIDENT: I understand the accounts have been audited.

THE TREASURER: The accounts were audited by a committee appointed by the Chairman of the Council this morning.

DR. CORBETT: It is not fair to put business matters in the hands of doctors. I move that the Board of Councilors be requested to have all financial transactions of the Association audited by some one of the regular auditing companies, and that they publish the returns that have been made. I think we would feel very much more secure if that were done than we do at the present time.

Seconded and carried.

THE PRESIDENT: The reports of the Secretary, the Treasurer, and the Attorneys are now before the House of Delegates for acceptance and adoption.

DR. R. J. HILL: I move that these reports be accepted and adopted.

Seconded by Dr. Wattam and carried.

DR. HILL: I move that Dr. J. G. Cross be selected as a delegate from Hennepin county in place of Dr. J. W. Bell, who is unable to be present, and his alternate is also absent.

Seconded and carried.

THE PRESIDENT: We will now listen to a report from our delegate Dr. Magie, to the American Medical Association.

Dr. W. H. Magie presented the following report:

REPORT OF THE SPECIAL MEETING OF THE  
HOUSE OF DELEGATES OF THE AMERICAN  
MEDICAL ASSOCIATION HELD  
IN CHICAGO, ILL., NOV. 11th  
and 12th, 1920

Gentlemen:—

Since the last meeting of this house, which was held in St. Paul, October 1920, there has been two meetings of the House of Delegates of the A. M. A. The first meeting was a special meeting held in Chicago, November 11th and 12th, 1920. I attended this meeting; Dr. J. W. Bell was not able to attend. This meeting was in response to a call issued by the Board of Trustees of the A. M. A. for the purpose of amending Chapter XVII of the By-Laws so that it would call for seven dollars per annum as dues, instead of five dollars, as it was at that time.

The meeting was held in special session at the Headquarters of the A. M. A. and was called to order by the speaker of the House, Dr. Dwight Murray of Syracuse, New York. As was stated in the call, the purpose of the meeting was to increase the annual dues of the Association.

The proposed increase became necessary on account of the increasing cost of publishing the journal. The cost of paper and labor had advanced to such a price that the journal was losing money and eventually, would lead it into a state of bankruptcy, if additional income was not provided for.

After listening to reports of various committees and after a thorough debating of the question, it was finally decided that an increase of one dollar per annum, making six in all, five of which should go to the journal, would probably be sufficient, at least for the time being. When the question was finally put to vote, it was carried almost unanimously, only two votes being recorded in the negative. The Section XVII of the By-Laws, was therefore, amended to read six dollars per annum instead of five dollars, as before.

As this meeting was called for the special purpose of amending Section XVII of the By-Laws, no other business came before the House and it adjourned.

The above respectfully submitted for your information.

Yours very truly,

W. H. MAGIE, M. D.

REPORT OF DELEGATES TO THE AMERICAN  
MEDICAL ASSOCIATION AT THE LAST  
MEETING HELD IN BOSTON,  
JUNE 6th, 1921

To the House of Delegates to the Minnesota State Medical Association:

We beg to submit the following report:

Aside from the usual routine business and the hearing of reports from the various committees, the chief interest of the meeting of the House of Delegates centered on a memorial presented by Attorney General Sawyer, concerning the proposed establishment by the Government, of a Department of Public Welfare, under which were to be co-related the various activities pertaining to public health, which are now administered by several different departments of the Government.

This at once brought out a lengthy discussion involving the question of State medicine, and the House of Delegates went unanimously on record as opposing extension of State jurisdiction as applied to the regulation of medicine, except insofar as it was necessary in the control of contagious and communicable disease, and voiced its sentiment as being strongly opposed to the treatment of disease except in institutions maintained by the State.

It affords us pleasure to announce the re-election of Dr. Thomas McDavitt of St. Paul as one of the trustees of the Association.

Respectfully submitted,

J. W. BELL, M. D.

Delegate.

JOHN L. ROTHROCK, M. D.

Alternate for Dr. W. H. Magie.

THE PRESIDENT: The report of our delegate to the American Medical Association is now before you. What disposition do you wish to make of it?

It was moved and seconded that the report be adopted. Carried.

DR. HILL: Dr. Scofield from Benson forgot to bring his credentials with him. He represents Kandiyohi-Swift county. I move that he be seated as a delegate from that county.

Seconded by Dr. H. M. Workman, and carried.

The President called for the report of the Editing and Publishing Committee.

In the absence of the Chairman, Dr. Farr, Mr. J. R. Bruce, Executive Secretary of the Association, presented the report as follows:

REPORT OF EDITING AND PUBLISHING COMMITTEE

MINNESOTA MEDICINE has continued to make progress during the last year. We have published a larger volume of material than during any preceding year, the journal averaging 99 pages per issue. Of

this about 30 pages were advertising, and 60 or more pages reading matter.

Printing expense has not decreased and is not likely to for some time to come. The cost of paper stock is much less than it was last year, and we anticipate a considerable saving in this item for the ensuing year.

The journal has not been issued on time for the past few months owing to the printers' strike. This is still in effect, but conditions are rapidly improving and should reach normal within the next month or so. The company printing MINNESOTA MEDICINE lost a very large proportion of its employees, and we feel has rendered very good service under the circumstances. It was felt at one time that we would be compelled to skip one issue, combining two monthly issues in one, but it seems now that this may be avoided.

The August number was issued late owing to the printers' strike above referred to. At the time of closing the books for the year the printer's statement for printing the August number had not been received. This month's issue is therefore not included in the expenses for the year.

From September 18, 1920, to August 18, 1921, we remitted to the Treasurer of the Association on account of advertising executed in MINNESOTA MEDICINE and subscriptions, a total of.....\$7,636.94

Credits at \$2.00 per capita for subscriptions to the magazine from September 1920 to August 1921,  
1636 members ..... 3,288.00  
Total receipts ..... \$10,924.94

#### DISBURSEMENTS

Printing .....\$4,928.44  
Paper stock ..... 2,122.07  
Bruce Publishing Company—for services including cost of telephone, solicitation of advertising, general handling of magazine, telegrams, office postage, stenographic service, etc..... 2,231.46  
Editorial expense ..... 817.67  
Miscellaneous, including illustrations, clipping service, second-class postage, mailing wrappers, and other incidentals..... 324.62  
\$10,424.26

Surplus .....\$ 500.68  
MINNESOTA MEDICINE is now in its fourth year. From January 1, 1918 to the present time the journal has to its credit..\$28,819.36  
To which should be added accounts receivable ..... 1,327.91

Making a total of .....\$30,147.27  
The total expenses for the same period have been .....\$29,556.79  
Leaving a surplus to the credit of the journal to date, of..... \$590.48

THE PRESIDENT: The report of this Committee is before you.

DR. CORBETT: I would like to ask what the actual circulation of MINNESOTA MEDICINE is?

MR. BRUCE: We are putting out 2200 copies. A copy of MINNESOTA MEDICINE goes to every member of the State Association, of which we have about 1644 at the present time. We send copies of the journal to the exchanges and advertisers. In addition, we send out a number of complimentary

copies. I think last year we had 200 or more paid subscribers in addition to the State Association list. We have considerable distribution of the journal outside of Minnesota.

DR. CORBETT: About 100?

MR. BRUCE: More than that, doctor. As I have said, the membership is about 1644 at the present time, and we have probably 500 outside of that.

DR. CORBETT: What I am trying to get at is the actual subscription list.

MR. BRUCE: The actual subscription list is 1800 or more, that is, paid subscriptions.

THE PRESIDENT: Is there any further discussion? If not, a motion to accept or adopt the report is in order.

It was moved and seconded that the report be adopted. Carried.

THE PRESIDENT: We will next listen to the report of the Committee on Public Policy and Legislation.

DR. J. G. Cross: I wish to present the following report:

#### REPORT OF COMMITTEE ON PUBLIC POLICY AND LEGISLATION

To the President and the House of Delegates of the Minnesota State Medical Society:

Your Committee on Public Policy and Legislation begs to submit the following report:

At the last session of the State Legislature, three bills were introduced which required the attention of your Committee. The first, which may be termed the Osteopath bill, was pernicious in its provisions, and if enacted into law would have seriously endangered the present safeguards thrown about the public health of the state of Minnesota. As the provisions of this bill are well known to all members of the Society, it is unnecessary to recount them at this time.

The Osteopath bill was introduced in the House and referred to a Committee, before we knew of it. An effort was immediately made by members of your Committee on Public Policy and Legislation to obtain a hearing during the consideration of the bill, without success. The bill was reported back to the House, and it was only by strenuous and indefatigable work, and the active response of the members of this Society to the appeal of your Committee for help, that the House bill was defeated. The same bill had been introduced in the Senate and referred to a Senate committee.

Our committee was notified that they would be heard by the above Senate committee. We appeared with our attorney ready to state our objections. The bill was never considered in committee, however, the chairman announcing that it had been defeated in the House that afternoon. The defeat of this bill was undoubtedly due to the influence exerted by members of this Society and your Committee, upon members of the Legislature to show them the pernicious features of the bill and that it was undesirable legislation.

Your Committee was called upon to consider two other bills which were introduced at the last session. One was a bill for an act to amend the statute of limitations in regard to actions in certain cases.

The effect of this bill, if passed, would have limited the time for bringing action against physicians, surgeons, dentists, hospitals, sanitariums and others for the malpractice, errors, mistakes, or failure to cure, to within two years instead of at present six years. Your Committee on Legislation and Public Policy, believes this to be a desirable change in the law and favored its passage. It met with strong



opposition, however, and was defeated. The third bill was designed to do away with so called privileged communications in malpractice suits against physicians, surgeons, dentists, hospitals, sanitariums. This bill, was also defeated in spite of the fact that we considered it desirable legislation.

As a result of our experience during the last session of the legislature with the above three bills, your Committee is convinced that its duty as the Committee of the State Society, on Legislation and Public Policy makes it necessary to take an *active* and not a mere *passive* interest in proposed legislation. The State Society as representative of the medical profession of the commonwealth assumes the position that its knowledge and skill lays upon it as a duty, to guard public against incompetent care in cases of illness. No argument should be needed to show that bills will continue to be placed before this and other legislatures for the purpose of permitting the public to be practiced upon by individuals who do not possess the necessary qualifications for treating the sick. The members of the Legislature frankly admit that they are unable to judge the questions involved in medical matters. They state positively, that in the mass of business coming before the House and Senate, it is impossible for them to do more than to hear in committee those interested in pending bills. If no one is interested enough to appear and present his side for or against a bill, it is assumed that he has no interest for or against the bill. There was no qualified physician in either House of the Legislature, so that without watchfulness from outside, it is doubtful whether the members of the State Society or the medical profession would have known until after its passage that such a bill as that proposed by the osteopaths have been introduced. Your Committee, therefore, believes that the action taken at the last meeting of this House of Delegates should be rescinded and the Committee on Legislation and Public Policy should assume, as one of its principal duties, the scrutiny of proposed legislation, and the organization of the medical profession for good, and against bad bills.

Your Committee desires here, to express its appreciation of the stand taken by the honored President of the Society, Dr. Riggs, and for the active and energetic responses of members of the State Society to the call of the Committee for help.

In this connection, also, a suggestion has been made by the Dean of the Medical Department of the State University, that legislation should be enacted in Minnesota requiring all applicants for the group of professions in which medicine belongs, to take an examination in the common scientific branches before a state board of examiners each one of whom should be expert in his own line. It was suggested that such examinations could well be conducted by the University of the state. Your Committee considers this suggestion as worthy of consideration but does not at this time take any action upon the suggestion, it having been made ad interim and not brought before the Society.

The matter of organized and authentic means of publicity to the end that the lay public be properly informed in medical matters, has been at various times, under consideration. Your Committee believes that consideration of this subject is timely and that it is not too early for some action to this end to be undertaken. We had already agreed to incorporate in this report a recommendation that we believe the American Medical Association to be the logical agency through which the public should get authentic information pertaining to matters of public health and other things involving medical ques-

tions. Your Committee is gratified to find that the President of the last House of Delegates, Dr. Dwight H. Murray recommended the establishment of means of communication between the medical profession and the general public concerning matters of medical interest, to promote a better understanding of the aims of the profession, the preventive measures against disease, and the danger of irregular practitioners from ill-conceived medical laws. As the Committee of Reference on Reports of Officers at the A. M. A. meeting expressed approval of the plan as proposed by Dr. Murray, it is likely that the American Medical Association will develop some plan along the line suggested. Your Committee on Legislation and Public Policy, therefore, recommends that the Minnesota State Medical Society express to the Board of Trustees of the A. M. A. the hope that the A. M. A. develop such a plan of publicity.

Respectfully submitted,

J. G. CROSS,

J. T. CHRISTISON,

F. J. SAVAGE,

Committee on Legislation and Public Policy.

At the conclusion of the report, Dr. Cross moved its adoption. Seconded.

DR. W. A. JONES: I would like to suggest in continuation of the suggestions made by the committee that we advertise in the public press in order to counteract the pernicious advertising of these unqualified men. This can be done either under the direction of the American Medical Association or preferably by our State Association, under the direction of a committee from the Minnesota State Medical Association. It seems to me, the public are very anxious to know more about what doctors are doing, what they are thinking about, and how they consider the welfare of the public in health matters, and to that end I think this matter ought to be thoroughly gone over, and we should carefully take up the question of public advertising in the daily press.

DR. CORBETT: I would like to say a word in this connection. There is a ray of hope in what has been said. Newspaper men have called me up and have asked me for information in regard to certain items of medical interest, and whether this thing or that thing is worth publishing. There is a tendency on the part of newspapers to seek out information from the doctors as to what they should bring before the public, and I believe we ought to take advantage of this. In every community where there is a paper published, there should be a committee appointed, and let this committee be selected by the State Medical Association, so that the information the press gets may be censored by an intelligent body of men. While I have not talked with any newspaper men about this, I believe that if we approach them in the right way they would meet us half way and publish propaganda that would be of value to the medical profession.

DR. E. G. McKEOWN: Senator Cassio told us that if we did not wake up as a medical profession, we would wake up too late. Mr. Hall was on your committee, Dr. Riggs, and an osteopath is taking care of him, and he is plugging for the osteopaths. If you go back over the literature you will find that their regular practitioners are making more money out of their trade than we do out of our profession. When the bill was up for consideration Senator Cassio said there were twenty letters written and twenty people present representing irregular practitioners to every one regular practitioner.

DR. J. C. ROTHENBURG: The American people are a gullible class of people when it comes to the practice

of medicine. Every time a State Association or the American Medical Association takes concerted action as a body the public will raise a howl. That has been your experience, as it has been my experience, and then these people will speak about being deprived of American liberty. It seems to me, the best we can do, and I have looked into this matter in its many different phases, is to hammer along and let every one of us educate his clients in his community. I believe that is the best way. Individual propaganda is my idea of reaching the public.

DR. W. A. JONES: I still adhere to the one-page advertisement.

DR. J. G. CROSS: I would like to call attention to one or two things which are most important in our consideration of the matters referred to our Committee. I do not know whether it will be necessary for the House of Delegates to go into the Committee of the Whole to consider these things, or not, but they are as important as anything that will come before us. The first matter is that the action of this House of Delegates practically committed the State Association to a policy of *laissez faire* in the last legislature. I would like to say that your Committee disagreed emphatically with that position, and if this report is adopted it will rescind that action: the State Association will be bound to take an active interest in these matters.

Another thing which I would like to emphasize is this: I have no question in my mind but that the bill can be modified and improved along the lines which have been suggested by our opposition to the last osteopathic bill and will be introduced at the next session of the legislature and undoubtedly will pass. That bill we may expect to see very much improved for passage in the eyes of the members of the legislature by making all of the requirements in the future for the licensing of osteopaths rather hard. The difficulty will be this, as I foresee it: When the licensing bill at present in force was passed by the State legislature, it allowed those men who had been in practice a certain number of years, and were in good standing, and were certified to be in good standing, to continue in practice without examination. You see the effect of this on the legislature. Why should we not do the same thing with so-called reputable men of other schools, as they term it? There is going to be the danger. That is the nigger in the woodpile. That bill is likely to pass in spite of all you can do. I do not like to pose as a crepe-hanger, but the evidence points that way.

The suggestion made by Dr. Jones and incorporated in the Committee's report is a very important one, that is, the education of the public to the need for competent attention by those who care for the sick, and a searching examination for them. You are going to have an osteopathic bill, you are going to have an osteopathic law in Minnesota, I believe, and I do not see how it can be prevented unless our publicity work gathers sufficient strength so that these people will not dare attempt to do these things, but I much fear they will. Please bear in mind that the adoption of this report will rescind the action of the House of Delegates of last year, which is desirable.

THE PRESIDENT: I do not believe the osteopaths will be successful if the idea I have suggested to you with reference to a standardized examination is carried out.

DR. W. A. JONES: What is your idea about the chiropractors? They are in the ascendancy at the present time because they are great advertisers. The osteopaths are afraid of them. The chiropractors have no laws to govern them. There is nothing

said about their conduct or care of the sick, yet they are forging ahead and advertising all the time.

THE PRESIDENT: My opinion of the chiropractors is probably the same as yours. I see no other way of accomplishing our purpose than along the lines I have indicated. It has succeeded in Alberta, in Illinois, and in New York. There is no reason why we cannot accomplish it in Minnesota. With a standardized examination everybody is put on the same level, and nobody can find fault. If this osteopathic bill goes through it is because we let it go through.

The motion to adopt the report was put to a vote and carried.

DR. H. M. WORKMAN: I move that the Chair appoint a Publicity Committee, consisting of three members, of which the President shall be one. Seconded.

DR. F. J. SAVAGE: Before the motion of Dr. Workman is voted on, I would like to call the attention of the House of Delegates to the fact that this matter has been covered in the report that has been read, although it is put up to a committee of the American Medical Association. If there are men enough who have the time to study to the extent of having their opinions go before the public through the daily press on any matter that may be presented to them, so that their opinion is what you might call a finished opinion—if there are three men who are competent to do it and are willing to serve, I have no objections at all. The logical thing is to let it go through the American Medical Association, for the reason that it will take a tremendous amount of time and energy. I question very much if there are any three men scattered in different cities who can give their time to these matters. I would be very glad to see Dr. Jones put on that committee, if this motion prevails. However, as I have said, the logical thing to do is to let the American Medical Association handle it as suggested in the report, and let there be a central station of propaganda to be fed to the different component societies by the headquarters of the American Medical Association. In that manner I think we will get better results.

Motion put to a vote and carried.

THE PRESIDENT: We will listen to the report of the Member of the National Legislative Council Dr. Ritchie.

Dr. Harry P. Ritchie presented the following report:

#### REPORT OF MEMBER OF NATIONAL LEGISLATIVE COUNCIL

I am appending to my report the Transactions of the Annual Congress of Medical Education, Licensure, Public Health, and Hospitals which met in Chicago, March 1921. Meeting at the same time in Chicago was the Association of Medical Colleges. This is the second meeting that I have attended as a delegate from this Society. The enthusiasm of my report of last year is only augmented by my experience of this year. I presume there is no other body of men gathering from all sources of general, or special medical practice, more representative of the best things of our work. The Congress is as a whole without legislative power and is simply a clearing house for the exchange of ideas upon many policies. This year the discussion of Post Graduate teaching concerned the greater part of the time. The subject was attacked from all aspects, the laboratory as well as the clinical and presented as reports of committees composed of representatives and acknowledged leaders in their departments. In most instances the reports were read by the chairman and



were so exhaustive as to permit of but little discussion. I believe it impossible and even improper to even attempt an abstract of them for such a report as this without becoming very tedious. But anyone interested may find much information on this very important phase of teaching of medicine. The meeting was largely attended, with several foreign representatives, one of whom was most interesting and very prominent in England at this time, Mr. C. C. Choice, the well known surgeon, being the new head of the University Hospital in London recently stimulated to new growth by the Rockefeller Foundation.

HARRY P. RITCHIE.

THE PRESIDENT: What disposition do you wish to make of this report?

It was moved and seconded that the report be accepted and adopted. Carried.

In the absence of Dr. J. E. Hynes, Chairman of the Committee on Social Insurance, the report of this committee was read by the Secretary, as follows:

#### REPORT OF COMMITTEE ON SOCIAL INSURANCE

To the House of Delegates of the Minnesota Medical Association:

Sirs:

The Committee on Social Insurance desires to submit the following report:

The year past, as well as the one preceding it, has been marked by great unrest. The tendency has been one of breaking away from old ways and traditions. To assume that the medical profession will escape the general upheaval would be folly.

We urge that thought and study be given by the profession to the problem of Social and Industrial Medicine.

After investigation of the English or Panel system the Committee believes that such a system takes away the initiative of the individual physician and thereby impairs by so much the initiative and usefulness of the medical profession. The Panel men are paid irrespective of qualifications and the incentive towards better work is taken away. There is no opportunity for advancement of the individual and the manifest result among the medical men is to stifle the spirit of investigation, and research is practically out of the question as the Panel men are too busy with the trivial problems they meet daily.

The Committee is of the belief that the system is arousing increasing dissatisfaction among the general public and that such a system cannot be satisfactory to the patient.

Were such a system introduced to our own country, the question of political preferment would at once come up and is justly to be avoided.

In Minnesota we already have an approach to social insurance in the industrial lines. We refer to the Employer's Liability Act, an entering wedge toward social insurance, since what is fair to the employed man in industry is equally fair to the family dependent upon such employee and they have the right also to demand protection from the same source, i. e., the state.

As the problem is one for study and one in which the entire profession is concerned and should be informed, and as the Medical School of the University of Minnesota is the teaching and research medical institution of the state, we recommend and strongly urge:

(1) That the Minnesota Medical Association urge its members to give the subject of social insurance thought and study as we believe some form of social or industrial insurance is inevitably to be widely tried throughout the country. We believe that such

study is necessary as a foundation for the settlement of these problems when they present themselves before the legislative bodies.

(2) We urge that the Association recommend to the Board of Regents of the University of Minnesota that a course or courses on industrial medicine be added to the curriculum of the school. We believe that the medical student of today will have an important part in the solution of these problems and deem it just that he be taught concerning the phases of industrial medicine as it exists today and thus be better prepared to meet the problems as they arise.

(3) We recommend that a copy of this report be sent to the President of the University of Minnesota, to the Board of Regents, and to the Dean of the Medical School.

Respectfully submitted,

JOHN E. HYNES, Chairman.

S. MARK WHITE.

CHAS. R. BALL.

THE PRESIDENT: What do you wish to do with this report?

DR. JONES: I move that the report of the Committee on Social Insurance be accepted.

Seconded by Dr. Wattam.

DR. CROSS: I move to amend the motion of Dr. Jones by leaving out the acceptance of that part of the report which recommends the teaching of industrial insurance in the universities, solely because the whole subject is so unsettled that I think it would be impossible to find any man or any set of men at the present time who could give students anything but a partial view on the subject. We do not know any of us how it is coming out. Of course, we have our individual opinions. Seconded.

DR. JONES: I accept the amendment.

DR. WARREN A. DENNIS: I understand the adoption of this report carries with it the recommendations. I do not know exactly why the University of Minnesota should be requested to take up the subject of social insurance or investigate it. If it means that this association wishes to pass the buck to the University, I would be opposed to it. Social insurance is going to be a very live question in this country in the next year or two. Already commissions have been appointed in twenty different states to study social insurance and bills have been introduced which have narrowly escaped passage. We need to study this matter carefully and also to study the effects of this kind of insurance in England and Germany. As stated in the report, it destroys efficiency and initiative in the men who are doing that class of work. It takes three-quarters of their time in doing clerical work which has absolutely nothing to do with the care of the sick. It enlists the services of men who are the least qualified to take care of the sick and who are not able to stand on their own feet. Men who are thoroughly competent prefer not to do that kind of work. This sort of legislation is absolutely pernicious, but we will have to meet it in the near future. I approve of what is said in the report regarding the tendency to build up a political machine by men who are doing this class of work, who are making a living out of it that they were unable to make before, and we shall, in this country, if we are not careful, see an army of bureaucrats and people upon whom we may become dependent in Washington. I think this is a very important subject, one that we need to consider carefully.

The Secretary was asked to read the recommendations contained in the report of the committee, which he did.

After the reading of the recommendations, Dr. Dennis moved that the thanks of the House of Delegates be extended to the Committee for their valuable report, and that the report be laid on the table.

Seconded and carried.

With reference to the Delegation to Assist in the Collection and Publication of the Papers of the late Dr. H. A. Tomlinson, the Secretary read the following communication from Dr. Aaron F. Schmitt:

August 2, 1921.

Dr. Carl B. Drake, Secretary,  
Minnesota State Medical Association,  
St. Paul, Minn.

My dear Doctor Drake:

In reply to your letter of July 27 in regard to a report on the collection and publication of the paper of the late Dr. H. A. Tomlinson, I wish to advise that I have been unable to get this committee together, and for this reason will ask that the committee be continued for another year.

Respectfully yours,

AARON F. SCHMITT.

THE PRESIDENT: What will you do with this report?

It was moved and seconded that the report be accepted and the committee continued. Carried.

DR. SAVAGE: It seems to me one very important matter has been passed over rather lightly, and that is with reference to an examining board referred to, requiring that those who propose to practice the healing art in Minnesota shall pass a standardized examination such as that referred to. Now, there will be no session of the legislature this coming year, but any action this State Association may see fit to take a year from this fall must not be any snap judgment. It must be well thought out and a matured opinion arrived at before we want to do anything. Therefore, I move that the President appoint a committee to investigate and report, at the next session of the Minnesota State Medical Association, on the question of a common Examining Board in the four or five fundamentals (Dean Lyon mentioned four fundamentals in his communication) for those who propose to practice the healing art in any form in the state of Minnesota.

Seconded and carried.

THE PRESIDENT: I am deeply appreciative of this action. I feel very keenly along this line and that is our way out.

The next report is that of the Hospital Committee (There was no response from any member of this Committee).

THE PRESIDENT: We will now listen to a report of the Committee on Cancer. Dr. Verne C. Hunt is Chairman of that Committee.

#### REPORT OF CANCER COMMITTEE

DR. HUNT: In 1913 the American Society for the Control of Cancer was founded through the meeting of various clubs and various medical societies in this country. The Society was founded in New York City. The Society has 80 directors composed of leading internists, surgeons and pathologists of this country, about 60 of them, and 20 laymen, as directors. The Society during the war was unable to conduct very much in the way of a campaign. The ideas and plans of what the Society desired to accomplish through its organization were the obtaining of information relative to cancer and a dissemination of knowledge of cancer to the public. It has only been recently gotten into a position where this campaign can be conducted and it is their plan to conduct a National campaign the first week in November. A short time ago I was appointed as Regional

Director for the states of Iowa, Minnesota and Montana. Through this directorship a committee of the state of Minnesota have become interested in the work of the American Society for the Control of Cancer. During the session of the Minnesota State Society meeting we shall hold a meeting of this Committee and outline the activities of the Committee for the conduct of this campaign the first week in November. The plans for the organization will be formulated and it is hoped the Committee of members of the medical profession in the state of Minnesota will be called upon individually to aid in this campaign, and it is the sincere wish of the members of the Committee in behalf of the American Society for the Control of Cancer that they respond in this campaign to the best of their ability.

THE PRESIDENT: What shall be done with the report of this Committee?

DR. JONES: I move the report be accepted and the Committee continued.

Seconded and carried.

THE PRESIDENT: We will now listen to the report of the Committee to Formulate a Plan for Reference Committee System.

Dr. G. D. Head, Chairman, presented the following report:

#### REPORT ON REFERENCE COMMITTEE SYSTEM

This committee recommends that a reference committee system similar to that in use by the American Medical Association be adopted by the State Society in order to facilitate its business and give time for the proper consideration of such important matters as may come before the Association. The committee would recommend that these committees be appointed by the incoming president, that each committee consist of three members, and that the chairman of the committees be appointed for a three year period, and the other members for a two year period, one member retiring each year; that matters requiring consideration by the society be referred by the president to the respective committees upon the first day of the session, and that these committees report at the first session of the society upon all matters referred to them holding over from the preceding year, and, on the second day of the session, upon all matters referred by the president the first day of the session.

The committees recommended are as follows:

1. Reference Committee on Section and Section Work.
2. Reference Committee on Rules, Order of Business, Amendments to the Constitution and By-laws.
3. Reference Committee on Public Policy and Legislation, (the standing committee now in existence to act as a reference committee for the House of Delegates upon matters of public policy and legislation).
4. Reference Committee on Medical Education.
5. Reference Committee on Public Health, Hygiene and Sanitary Science, (the standing committee on Public Health to act as a reference committee for the House of Delegates upon these matters).
6. Reference Committee on Miscellaneous Business.
7. Reference Committee on Publications: Editing and Publishing of committee to act as the reference committee upon all matters related to the publication of the Journal and other publications.

Geo. Douglas Head, Chairman.  
W. A. Coventry.  
Longstreet Taylor.

At the conclusion of the report, Dr. Head moved the adoption of the report, which was seconded.



DR. JONES: Does the Committee on Publication include propaganda?

DR. HEAD: That was not considered. As Chairman of the Committee, I would not feel justified in acting for the Committee without due and proper consideration. My own individual feeling would be that it would depend largely upon the kind of propaganda that would be prepared. I believe that is a two-edged sword. We don't want to be too careless with it. That is my own feeling. We are able to put up a tremendously strong stand in the community along our professional lines, and I am not sure how far the matter of propaganda ought to be carried by a body of medical men. It requires, Dr. Jones, very careful consideration, and I would not want to act for the Committee nor to accept for the Committee your suggestion at the present time.

DR. WORKMAN: I would like to ask Dr. Head a question. I understand the Editing and Publishing Committee consists of five members. Is it your intention to change this?

DR. HEAD: The intention was, so far as the membership of the committees is concerned, that they shall be newly-created committees. Perhaps that ought to be more clearly stated in the report, and it is a good point you have brought up. It was the intention to have a committee of three; as to the old committees, letting them stand as they are, without change.

DR. WORKMAN: I think it is well to have that understood.

The motion was put to a vote and carried.

The President called for the report of the Committee to Attend the Next Meeting of the State Teachers Association, but there was no response.

The President called for the report of the Committee to Confer with the Minnesota Health Committee.

The Secretary read the following:

The untimely death of Dr. Charles E. Smith, Jr. on July 13, 1921, prevented his submitting a report of the Committee to Confer with Minnesota Health Committee. The conference met in St. Paul in January 1921, during the time Dr. Smith was south for his health, but the program was participated in by the other member of the committee. Nothing was referred to this committee by the Conference for its consideration.

THE PRESIDENT: What will you do with this report?

DR. HILL: I move its acceptance.

Seconded and carried.

Dr. H. C. Cooney, Princeton, presented the report of the Committee on Necrology, as follows:

#### REPORT OF COMMITTEE ON NECROLOGY

Dr. Flora L. Aldrich, of Anoka, Minnesota, graduate of University of Minnesota 1887, died March 19, 1921. Dr. Aldrich was a woman of culture, dignity, force and ease of manner; her work exemplified the highest and best in medical ideas and practice. She was always keenly interested in the affairs of the nation, and those of her own state, an untiring worker for the support of all institutions and undertakings to benefit the community in which she lived.

Dr. O. W. Anderson of Rochester, Minnesota, died at his home December 26, 1920, aged 80 years.

Dr. Thomas Leger Firth Armitage, Princeton, Minn., graduate of Medico Chirurgical College, Philadelphia 1892, died June 3, 1921. Dr. Armitage was a successful popular physician of the old school highly esteemed in the locality where he lived and practiced his profession for twenty years. Member of the A. M. A., Royal Society of Arts, London; Fel-

low Hon. Council, North British Academy of Arts, England, and a 32nd degree Mason.

Dr. Frederick R. Baldwin, physician at Glen Lake Sanitarium, died at the University Hospital, in November 1920.

Dr. E. J. Batchelder, assistant in Pediatrics at the University of Minnesota, died in Minneapolis, September 1920, aged 54 years.

Dr. Jasper Bedint died at his home in Kasson, Minnesota, November 24, 1920, aged 82 years.

Dr. Jeheil Weston Chamberlain, St. Paul, was born Oct. 23, 1857, at Rock Falls, Wis. He received his early education at Galesville Academy, Wisconsin, and his medical degree at Rush Medical College in 1882. After practicing for 3 years at Eau Claire, Wis., he moved to St. Paul in 1885. At various times he was president of the Ramsey County Medical Society, the Minnesota Academy and the Minnesota Ophthalmological Society. Death occurred June 14, 1921.

Dr. W. E. Chapman, Litchfield, Minn., graduate of Vermont State University, Burlington, Vermont 1879, died Feb. 5th, 1921.

Dr. T. A. Conley of Cannon Falls, died at his home Sept. 12, 1920, aged 72 years. He had practiced medicine forty-four years and was well known in medical circles.

Dr. Ira Leslie Edmonds, Clearwater, Minn., University of Michigan and Rush College 1884, member Minnesota State Medical Association, died January 2, 1921.

Dr. J. C. Farmer, McKinley, Minn., University of Minnesota, member of Minnesota State Medical Association, died Feb. 8, 1921.

J. C. Farmer, M. D., of McKinley, Minn., University of Minnesota 1895, died February 10, 1921.

Dr. J. C. Fitch, for more than fifty years a practicing physician of Hastings, died at his home July 23, 1920. He was a graduate of Rush Medical College and a veteran of the Civil War.

Dr. E. S. Frost of Minneapolis, Minn., born at St. Johns, Canada, April 1, 1843, graduated from the University of Pennsylvania 1868. Died May 3, 1921.

Dr. George L. Gates, pioneer physician of Winona, died at the home of his brother in St. Paul, July 4, 1920, aged 82 years. He was born in Connecticut, and came to Minnesota soon after the Civil War.

Dr. Arthur J. Gillette's prominence in the field of Orthopedic Surgery is world wide, and in his death Minnesota has suffered a great and enduring loss. The one great ambition of his life, the Hospital for the Crippled and Deformed, at Phalen Park, the first institution of its kind in America, stands as his personal and professional monument. Service was the key-note of the life of Arthur Gillette. The smiles of the children whose lives he lengthened, whose suffering he assuaged and whose deformities he corrected, will be his welcome in the world to which he has gone. Dr. Gillette was born October 28, 1863, died March 24, 1921.

Dr. James Wily Grant of Richville, Minnesota, died April 8, 1921, at the age of 74 years.

Dr. William Hambroer of Eden Valley, Minnesota died on November 19, 1920, at the age of 72 years.

Dr. William L. Hollister of Austin, Minn., graduated in New York 1861, died Feb. 25, 1921.

The death of Dr. William A. Hunt of Northfield, which occurred on January 27th, 1921, represents a heavy loss not alone to his family members, friends and patients, but to the medical profession. Dr. Hunt was born in Northfield in 1858. He was educated in the public schools and Carleton College of his native town, prior to completing a medical course at the University of Michigan in 1882. At the time

of his death he held one of the Vice Presidencies of the State Medical Society and was one of its strongest, most influential members.

Dr. J. C. Hvoslef, was born in Norway, August 24, 1839; died October 11, 1920. He graduated from the University of Norway at Christiania and practiced medicine at Lanesboro from 1876 until the time of his death.

Dr. Adolph A. Just, Crookston, Minn., Illinois 1881, died March 4, 1921, aged 70 years.

Dr. Arthur G. Kessler, physician in charge of the Sunnyrest Sanitarium, Crookston, a specialist in Tuberculosis, died Sept. 10, 1920. Born in Bryant, Indiana, 1876. At one time he was in charge of the Ottertail Sanitarium at Battle Lake.

Dr. Howard Lankester, for twenty-five years one of the best known physicians of St. Paul, died July 30, 1920, at Columbus Hospital, Milwaukee, being 75 years old. In October 1918 when the influenza was at its height, Dr. Lankester, although 72 years old, volunteered his services to the government.

Dr. George W. McIntyre of St. Peter, Minn. Died July 11, 1920, aged 67. He was born in Cleveland, Ohio, September 28, 1853, and received his medical education at the Minnesota Hospital College, Hamline, Minnesota. For several years he was assistant physician to St. Peter Hospital (State) and afterwards engaged in private practice in the city of St. Peter, Minn.

Dr. Carl V. Malmgren of Virginia, Minn., Illinois 1895, died March 1921.

Dr. F. R. Mosse, of Rochester, Minnesota, died on December 25, 1920, at the age of 65 years.

Dr. Burton J. Merrill was born in 1856 in Palmyra, Iowa. He graduated from Grinnell College in 1875 and received his M. D. at the Bellevue Hospital Medical College, New York in 1881. In the early days Dr. Merrill was Professor of Materia Medica at the St. Paul Medical College. He was for a number of years physician and surgeon of the Minnesota State Prison.

Dr. Harry R. Nordley of Minneapolis was born Nov. 8, 1887. A graduate in 1912 of the University of Minnesota, in 1917 he enlisted and was a member of Navy Base Hosp. No. 13, stationed at Minneapolis.

Dr. Charles K. Roys a graduate of the College of Physicians and Surgeons, N. Y., died at Rochester, Minn., September 1920. Dr. Roys had charge of a hospital in Shantung, China, for twelve years and was decorated by the Emperor for services rendered there, as Medical Missionary.

Dr. Charles Eastwick Smith, Jr., St. Paul, died July 31, 1921. He was born in St. Paul January 1882, received his B. A. at Yale University in 1904 and his M. D. from the University of Pennsylvania in 1908. At various times he was associated with the editorial staff of the St. Paul Medical Journal, the City Health Department and the United States Public Health Service. He was the Executive of the Minnesota Board of Health until shortly before his death.

Dr. Alfred Eugene Spalding was born in Sault Saint Marie, Michigan, Sept. 24, 1851, died December 4, 1920. He practiced at Luverne for forty-two years, and will be sorely missed by the Southwestern Minnesota Medical Society and the Sioux Valley Medical Association, for in both of these he took a deep interest, seldom missing a meeting.

John C. Stout, M. D., Oakland, California, American Medical College, St. Louis 1878. Died January 17, 1921, aged 74.

Dr. J. Harlan Stuart, was born in North Carolina 1836. He graduated from Bellevue, N. Y., in 1867. In 1903 he became interested in x-ray work and was the first man in Minneapolis to devote his time ex-

clusively to this work, which he continued until about a year before he died, although over 80 years old.

Dr. L. A. Ward, Bemidji, Minn., University of Illinois 1895, died January 16, 1921.

Dr. Forrado H. Welcome of Minneapolis, died December 22, 1920, at his home, at the age of 62 years.

Dr. E. E. Wells of Stillwater, died at his home in that city, May 17, 1920. He was born on a farm near Rockford, Ill., Dec. 8, 1870. He graduated from the Northwestern University Medical School in Chicago, Ill., 1898, and practiced his profession in Stillwater from 1903 until the time of his death.

Dr. John Gooch Whittemore of Donnelly, Minnesota, died at his home November 22, 1920, at the age of 49 years.

Dr. Van Wilcox died at his home in Minneapolis, aged 48 years, July 20, 1920. He graduated from the University of Minnesota, and practiced in Minneapolis for about fifteen years.

Dr. Alonzo P. Williams died Oct. 22, 1920, at his home in Santa Monica, California. Dr. Williams specialized in nervous diseases, and practiced in Minneapolis 12 years ago.

THE PRESIDENT: The grim reaper has been very active in our profession during the past year. This report is now before you. What do you wish to do in regard to it?

DR. CORBETT: I did not hear the name of Dr. A. C. Fairburn mentioned in the report of the Committee on Necrology, who died this summer.

DR. HILL: Dr. Fairburn was one of the prominent members of this Association. Within the last ten years he has been superannuated, living in Minneapolis, and has not been engaged in the practice of medicine. He was taken sick, and was taken to the City Hospital, where it was discovered he was suffering from malignant disease of the throat and pancreas, and died within two or three weeks after the discovery of the nature of his trouble. He was one of the ablest men we ever had in Minneapolis. Twenty-five years ago he was the type of the old school physician. He did the first laparotomy ever done in Minneapolis. He would do anything from the removal of a cataract to an ingrowing toe nail. He was ready for any emergency. He was a graduate of McGill University, and a wonderfully competent man. He had an enormous practice at one time. We considered him the best general practitioner we ever had in Minneapolis.

THE PRESIDENT: Was Dr. Chamberlain's name included in this list? It is difficult for me to say anything about him. We have been friends ever since I came to Minnesota. Many of you know him well. He had one of those sunny, delightful personalities that was all encompassing. You always felt better after you talked with him. As a physician, eye and ear man, he was very successful. Nothing can be added to the magnificent life which he lived. He lived up to the highest professional ideals. With that understanding, this report is before you for adoption.

It was moved that the report be adopted.  
Seconded and carried.

THE PRESIDENT: Is there any unfinished business to come before the meeting, Mr. Secretary?

THE SECRETARY: Nothing that I know of.

THE PRESIDENT: Is there any new business?

DR. C. L. SCOFIELD: There is another matter associated with the legislative committee. We have in this state an increasing interest manifested by the laity in regard to public health matters, and our



lay organizations are interested in public health. We have, outside of St. Paul and Minneapolis, 75 school nurses working throughout the state, and the people are largely working under committees of lay people. I need not say to this House of Delegates that public health is primarily a medical proposition. We have also an increasing number of chiropractors and osteopaths who are holding the positions of medical health officers in the state. They are using these positions to the limit for advertising purposes, and the reason this is possible is because the medical men of the state in some instances refuse to accept the miserable compensation that townships and villages are willing to pay for the services of those officers.

I would move that this House of Delegates urge upon the members of the State Association their active interest in all public health affairs in their localities and the acceptance of positions as health officers regardless of the financial returns, in order that the best interests of public health may be conserved.

Seconded by Dr. Wattam, and carried.

THE PRESIDENT: Is there any other business to come before this meeting? If not, a motion is in order to adjourn until Friday morning, at 10 o'clock, at the Commercial Club.

DR. HILL: I move we now adjourn until 10 a. m. Friday.

Seconded and carried.

The House of Delegates thereupon adjourned.

#### FRIDAY, AUGUST 26, 1921

The House of Delegates met pursuant to adjournment at 10 o'clock a. m., in the Commercial Club, Duluth, Minnesota, President Dr. C. Eugene Riggs, presiding.

THE PRESIDENT: The House of Delegates will please come to order. The first order of business is the report of the Committee on Credentials—Dr. Hill?

DR. HILL: I don't know, Mr. President, how it is possible to read the list. Have all of the members present handed in their credentials?

No response being made Dr. Hill read the list of delegates with the following changes:

Ramsey County:—J. T. Christison, St. Paul, Robert Earl, St. Paul, replacing Frank Savage, St. Paul.

Personnel of House of Delegates, as organized.

| SOCIETY             | DELEGATES                      |
|---------------------|--------------------------------|
| Blue Earth Valley   | Dr. H. J. Lloyd, Mankato.      |
| Camp Release Dist.  | Dr. E. M. Clay, Renville.      |
| Central Minn. Dist. | Dr. H. C. Cooney, Princeton.   |
| Freeborn County     | W. L. Palmer, Albert Lea       |
| Hennepin County     | W. A. Jones, Minneapolis.      |
|                     | R. R. Knight, Minneapolis.     |
|                     | M. J. Lynch, Minneapolis.      |
|                     | J. F. Corbett, Minneapolis.    |
|                     | E. K. Green, Minneapolis.      |
| Kandiyohi-Swift Co. | C. L. Scofield, Benson.        |
| Olmstead County     | H. Z. Giffin, Rochester.       |
|                     | A. H. Logan, Rochester.        |
| Ramsey County       | F. J. Savage, St. Paul.        |
|                     | E. M. Hammes, St. Paul.        |
|                     | C. N. Hensel, St. Paul.        |
| Redwood-Brown Co.   | J. C. Rothenberg, Springfield. |
| Red River Valley    | G. S. Wattam, Warren.          |
| Rice County         | H. E. Nelson, Crookston.       |
| St. Louis County    | M. L. Mayland, Faribault.      |
|                     | N. H. Gillespie, Duluth.       |
|                     | C. L. Haney, Duluth.           |
|                     | O. W. Parker, Ely.             |
| Southwestern Minn.  | E. G. McKeown, Pipestone.      |

Stearns-Benton Co. W. L. Beebe, St. Cloud.  
 Steele County J. W. Andrist, Owatonna.  
 Washington Co. W. R. Humphrey, Stillwater.  
 Wabasha County G. Schmidt, Lake City.  
 Wright County Victor Rosseau, Maple Lake.

(The resignation of Dr. J. Frank Corbett, of Minneapolis, was here tendered.)

THE PRESIDENT: You have heard the report of the Committee on Credentials. What is your pleasure in regard to it?

Motion to accept said report seconded and carried.

THE PRESIDENT: We are pressed for time. I understand there are all sorts of banquets to be served here. Now, as to the reading of the minutes, most of you are familiar with them.

Motion to dispense with the reading of the minutes of previous meeting seconded and carried.

THE SECRETARY: The only thing that I have to take up before the House of Delegates is the recommendation of the Council, which was made this morning, at the morning meeting.

The Council recommends to the House of Delegates that the reports of the Treasurer and Secretary and MINNESOTA MEDICINE be made to the end of the month last preceding that when the meeting is to be held.

Recommendation briefly discussed and motion was made to accept same, which was duly seconded and carried.

THE PRESIDENT: Any new business? (No response).

THE PRESIDENT: Next comes one of the most important functions of this House of Delegates, the election of a President. Nominations for president?

DR. CROSS: I would like to place in nomination the name of a man, who is very well known all over the state. He had made good in every department of medicine that he has undertaken, and who is 100 per cent plus American, if such a thing is possible; Dr. J. Frank Corbett, of Minneapolis.

THE PRESIDENT: I am no parliamentarian, but there is a question that arises in my mind. There is nobody I think more of than Dr. Corbett. In the first place, he is a delegate here; he cannot run for president according to the rules.

DR. HILL: He resigned. I read his resignation this morning. This was established in the case of Dr. Little some years ago; it was precisely the same state of affairs. He was a member of the House of Delegates and resigned and elected president at the same meeting.

THE PRESIDENT: Will you read that resignation?

THE SECRETARY: "August 25, 1921. To Executive Committee, Hennepin County Medical Society: I hereby tender my resignation as delegate to Minnesota State Medical Association.—J. F. Corbett." "Accepted at Special meeting, Executive Committee, August 26, 1921. E. H. Greene, Chairman pro tem; James S. Reynolds, W. R. Murray, A. E. Benjamin, J. F. Corbett."

DR. WORKMAN: Wouldn't that action practically nullify that part of the constitution?

THE PRESIDENT: This is for you to decide.

DR. CROSS: If we had had foresight enough to see what was coming, we would not have elected him as a delegate to this body. We did that thing and here we are. It does seem to me to be a contemptible thing to do, not to elect to office a man who is allowed to resign because the holding of the present office interferes with his old one.

Motion to accept nomination of Dr. Corbett made and seconded.

DR. SCOFIELD: I move that this question of the legality of this action be referred to the Council.

THE PRESIDENT: There is a motion before the House. Now, are you ready for the question?

Seconded and carried.

DR. SCOFIELD: I renew my motion that this legality be referred to the Council.

THE PRESIDENT: It is moved and seconded that the legal part of this business be referred to the Council. All in favor say "Aye".

The vote could not be ascertained and a standing vote was taken. Motion lost.

DR. CROSS: At the next meeting of the House of Delegates someone should introduce an amendment to the constitution which will do away with this provision.

THE PRESIDENT: Any other nominations?

Motion made that the Secretary be instructed to cast a ballot of the House of Delegates for the election of Dr. Corbett as President; motion seconded and carried; the Secretary casts said ballot.

Dr. S. H. Boyer, of Duluth, nominated for First Vice President. Nomination seconded and Secretary instructed to cast a ballot of the House of Delegates for the election of Dr. Boyer as First Vice President, with which the Secretary complied.

Dr. A. W. Ide, of Brainerd, nominated for Second Vice President. Nomination seconded and Secretary instructed to cast a ballot of the House of Delegates for the election of Dr. Ide as Second Vice President, which was done.

Dr. John Williams, of Lake Crystal, nominated for Third Vice President. Nomination seconded and the Secretary was instructed to cast a ballot of the House for the election of Dr. Williams, as Third Vice President. This was complied with.

Dr. Carl B. Drake, of St. Paul, was nominated for Secretary, which nomination was seconded and he was duly elected.

Dr. F. L. Beckley, of St. Paul, was nominated for Treasurer, which nomination was seconded and he was duly elected.

Dr. C. E. Dampier, of Crookston, nominated as Councillor for the First District, nomination seconded and he was duly elected.

Dr. R. J. Hill, of Minneapolis, nominated as Councillor for the Fourth District, nomination seconded and Dr. Hill declared elected.

Dr. F. A. Dodge, of Le Sueur, nominated as Councillor for the Seventh District, nomination seconded and he was declared duly elected.

Dr. J. W. Bell, of Minneapolis, was elected as delegate to the American Medical Association. Dr. F. L. Adair, of Minneapolis, elected as alternate.

It was moved and seconded that the President-elect be authorized to appoint all committees under the Constitution and By-Laws, for the ensuing year. Motion carried.

THE PRESIDENT: Any unfinished business? (No response). Any new business? (No response).

Adjournment at 11 o'clock a. m.

#### THE MINNESOTA STATE MEDICAL ASSOCIATION: MINUTES OF THE MEDICAL SECTION 1921

THURSDAY, AUGUST 25, 1921

The first session of the Medical Section of the Fifty-third Annual Meeting of the Minnesota State Medical Association was called to order in the Spalding Hotel, Duluth, at 9:15 a. m., by the Chairman, Dr. S. H. Boyer, Duluth.

Dr. Thomas R. Martin, Duluth, read a paper on "Duodenal Ulcer Treatment, Late Results". Discussed by Drs. H. K. Schaaf, Minneapolis; Charles B.

Wright, Minneapolis; Gustav Schwyzer, St. Paul, and L. L. Merriman, Duluth.

Dr. A. H. Sanford and Dr. T. B. Magath, Rochester, presented a paper entitled "The Etiology and Laboratory Diagnosis of Actinomycosis". Discussed by Drs. Gordon B. New, Rochester; N. L. Linnemann, Duluth, and Moses Barron, Minneapolis.

Dr. W. Ray Shannon, St. Paul, read a paper entitled "Anaphylaxis to Food Proteins in Breast-Fed Infants and Its Probable Relation to Certain Diseases of the Nursing Infant, Especially Exudative Diathesis." Discussed by Drs. J. T. Christison, St. Paul; S. E. Sweitzer, Minneapolis; T. L. Birnberg, St. Paul; A. H. Sanford, Rochester; Arthur H. Schwartz, Duluth; C. N. Hensel, St. Paul, and the discussion closed by Dr. Shannon.

Dr. S. E. Sweitzer, Minneapolis, presented a paper on "Dermatology and Internal Medicine". Discussed by Drs. N. L. Linnemann, and Arthur H. Schwartz, Duluth.

Dr. Moses Barron, Minneapolis, read a paper entitled "Carcinoma of the Lung; A Study of Its Incidence, Pathology and Clinical Importance With Report of 13 Cases Studied at Necropsy." Discussed by Drs. Gustav Schwyzer and Margaret Warwick, St. Paul.

Dr. Frank Spicer, Duluth, who was to have presented a paper entitled "Differential Diagnosis Between Tuberculosis and Other Lung Conditions" was unable to be present so his paper was not read.

Dr. Charles N. Hensel, St. Paul, read a paper on "Referred Pain in Heart Disease". Discussed by Dr. E. L. Tuohy, Duluth.

Dr. T. L. Birnberg, St. Paul, presented a paper on "The Differential Diagnosis Between Myxedema, Mongolian Idiocy, Rickets and Congenital Syphilis, with Special Reference to the X-Ray as a Diagnostic Aid." Discussed by Dr. O. W. Rowe, Duluth.

Adjournment at 1:00 p. m.

#### AFTERNOON SESSION

There was a joint meeting with the Section on Surgery, Thursday afternoon, Aug. 25, 1921.

#### MINUTES OF THE SURGICAL SECTION AND JOINT MEETINGS

The first session of the Surgical Section met in the large assembly room of the Spalding Hotel and was called to order at 9:30 a. m. by the Chairman of the Section, Dr. John T. Rogers, St. Paul.

Dr. Verne C. Hunt, Rochester, read a paper entitled "Submucous Ulcer of the Bladder and Its Surgical Treatment," which was discussed by Drs. Thomas, Schwartz, Braasch, and in closing by the essayist.

Dr. Robert Earl, St. Paul, read a paper entitled "Cystocele and Prolapse," which was discussed by Drs. McLaren, Coventry, Magie, Benjamin, Mann, Braasch, and in closing by the essayist.

Dr. J. Frank Corbett, Minneapolis, followed with a paper entitled "Surgical Treatment of Painful Scars." This paper was discussed by Drs. Schwyzer, Mann, Michael, Bratrud, Farr, and in closing by Dr. Corbett.

Dr. Wallace H. Cole, St. Paul, read a paper entitled "Treatment of Tuberculosis of Spine," which was discussed by Drs. Kuth, Geist, Henderson, Doolittle, and in closing by the essayist.

Dr. A. W. Ide and Dr. B. I. Derauf, Brainerd, contributed a joint paper entitled "Suspensions and Traction in the Treatment of Fractures." This paper was discussed by Drs. Braden, Daugherty, Henderson, More, and in closing by Dr. Ide.

Dr. Gilbert J. Thomas, Minneapolis, read a paper entitled "Urinary Lithiasis in Childhood and In-



fancy." This paper was discussed by Dr. Collins, after which the discussion was closed by the essayist.

On motion, the Section adjourned until 9 a. m. Friday, August 26.

#### JOINT MEETING OF THE MEDICAL AND SURGICAL SECTIONS

The meeting was called to order by President C. Eugene Riggs.

Majr S. F. Snively delivered an address of welcome.

In the absence of Dr. Arthur N. Collins, Vice President, Dr. John T. Rogers introduced President Riggs, who delivered an address entitled "Minnesota Medicine in the Making; Personal Reminiscences."

Dr. Margaret Warwick, Minneapolis, read a paper entitled "Intestinal Polypi and Their Relation to Carcinoma."

Dr. Joseph C. Bloodgood, Baltimore, Maryland, read a paper (by invitation) entitled "Diagnosis of Breast Tumors by Exploratory Incision," which was discussed by Dr. MacCarty, and in closing by the essayist.

On motion, the meeting adjourned until 9 a. m. Friday, August 26.

#### FRIDAY, AUGUST 26

#### SECOND SESSION OF THE MEDICAL SECTION

The second session of the Medical Section of the Fifty-third Annual Meeting of the Minnesota State Medical Association was called to order in the Spalding Hotel, Duluth, at 9:05 a. m., by the Chairman, Dr. S. H. Boyer, Duluth.

Dr. Henry L. Ulrich and Dr. Morris Nathanson, Minneapolis, presented a paper on "The Vital Capacity of the Lungs in Cardiac Disease." Discussed by Drs. M. D. Nathanson, Minneapolis, Harold L. Rypins, Minneapolis, and Moses Barron, Minneapolis.

Dr. Orville N. McLeland, Warren, read a paper entitled "The Results in Treatment of Inflammatory Diseases of the Gall Bladder and Its Ducts." Discussed by Drs. H. L. Ulrich, Minneapolis; Charles B. Wright, Minneapolis; Soren P. Rees, Minneapolis, and H. L. Lloyd, Mankato.

Dr. Porter P. Vinsun, Rochester, presented a paper on "Hysterical Dysphagia." Discussed by Drs. R. I. Rizer, Minneapolis, and S. H. Boyer, Duluth.

Dr. Henry W. Woltman, Rochester, addressed the Section on "Arteriosclerosis of the Nervous System". Discussed by Drs. E. M. Hammes, St. Paul; E. L. Tuohy, Duluth; Moses Barron, Minneapolis, and the discussion closed by Dr. Woltman.

Dr. C. A. Scherer, Duluth, read a paper on "Manifestations of the Spasmophilic Diathesis in Older Children". Discussed by Drs. T. L. Birnberg, St. Paul; Henry W. Woltman, Rochester; Herbert Wm. Jones, Minneapolis, and the discussion closed by Dr. Scherer.

Dr. J. A. Myers, Minneapolis, addressed the Section on "A Comparison of Lung Capacity Readings and Physical Signs in Pulmonary Tuberculosis". Discussed by Drs. S. Marx White, Minneapolis; Harold L. Rypins, Minneapolis; and the discussion closed by Dr. Myers.

Dr. C. A. McKinley, Minneapolis, read a paper entitled "Report of an Epidemic of Paratyphoid Fever Among University Students". Discussed by Drs. S. Marx White, Minneapolis; Albert J. Chesley, Minneapolis, and J. A. Myers, Minneapolis.

Dr. J. C. Michael, Minneapolis, presented a paper on "Mental Hygiene and the General Practitioner". Discussed by Dr. William A. Jones, Minneapolis.

Adjournment at 12:30 p. m. sine die.

#### AUGUST 26—SECOND SESSION OF THE SURGICAL SECTION

The Section met at 9 a. m. and was called to order by the Chairman.

Dr. Benjamin Davis, Duluth, read a paper entitled "Blastomycosis; Clinical Pathology and Therapeutics," which was discussed by Dr. Schwartz.

Dr. Horace Newhart, Minneapolis, read a paper on "Pyemia of Otitic Origin," which was discussed by Drs. Murray, Morseman, and in closing by the essayist.

Dr. Carl Hedblom, Rochester, read a paper entitled "The Treatment of Pericarditis with Effusion," which was discussed by Drs. Wallace, Magie, Baker, and in closing by the essayist.

Dr. W. A. Coventry, Duluth, read a paper on "Potter Version," which was discussed by Drs. Barry, Manley, Farr, Magie, and in closing by the essayist.

Dr. E. K. Green, Minneapolis, read a paper entitled "Principles Governing the Treatment of Fractures." The paper was discussed by Drs. Corbett, Henderson, Benjamin, Lenont, More, after which the discussion was closed by the author of the paper.

Dr. F. C. Schuldt, St. Paul, read a paper entitled "Marginal and Jejunal Ulcers Following Gastroenterostomy," which was discussed by Drs. Carroll, Corbett, and in closing by the essayist.

Dr. Emil S. Geist, Minneapolis, read a paper entitled "Circulatory Foot Disturbances," which was discussed by Drs. Kuth, Henderson, and in closing by essayist.

Dr. J. F. Plondke, St. Paul, read a paper entitled "Goiter Surgery," which was discussed by Drs. Schwyzer, Chapman, Williams, and in closing by the essayist.

Adjourned.

#### AFTERNOON SESSION

There was a joint meeting with the Section on Medicine, Friday afternoon, Aug. 26, 1921.

#### JOINT MEETING OF THE MEDICAL AND SURGICAL SECTIONS, FRIDAY, AUGUST 26, 1921

The meeting was called to order at 2 p. m. by President Riggs:

The President appointed Drs. W. A. Jones and R. J. Hill to escort the President-Elect, Dr. Frank J. Corbett, to the chair.

President Riggs, in introducing the President-Elect said: Dr. Corbett, I welcome you most kindly. The House of Delegates in honoring you has honored itself. Ladies and gentlemen, it gives me great pleasure to introduce to you a typical American, a distinguished surgeon, a real man, Dr. Corbett, of Minneapolis, your President-Elect. (Applause).

Dr. Corbett, in accepting the presidency, said: Mr. President and Members of the Minnesota State Medical Association: I cannot let the opportunity pass to thank you for the honor that you have conferred upon me. When I turn to my predecessors and consider the names of those who have occupied this position before, my heart feels sick, and I feel the mantle has fallen upon very weak shoulders; and I feel this at this particular time because I believe from the bottom of my heart the medical profession is confronted with problems that are more serious than the problems of the past. You know what these problems are. England has learned them at her own expense. Quacks have flourished since the beginning of the world, and in behalf of humanity we cannot let these people educate the public to their way of thinking. That is a problem that is before you during these years, and there is no one man in the chair or out of the chair or a committee that is big enough to handle it. Every member of

this Association must shape the destiny of the medical profession during the next few years.

I want to thank you again for the distinguished honor you have conferred upon me, and I also want to ask you to keep this big problem in view and for you to so advise me and help me that I may serve as your spokesman during this time. (Applause).

Dr. J. D. Lewis, Minneapolis, read a paper entitled "Cosmetic Rhinoplasty", which was illustrated with lantern slides.

At this juncture, Dr. Arthur N. Collins, Duluth, took the chair.

Dr. A. J. Chelsey, Minneapolis, Director of Preventable Diseases of the State Department of Health, was introduced and spoke on "Infantile Paralysis in Minnesota." (See Editorial page in this issue).

Dr. Charles H. Mayo, Rochester, read a paper entitled "The Relief of Jaundice Due to Pancreatic Obstruction."

Dr. S. M. White, Minneapolis, read a paper entitled "A Clinical Estimate of Myocardial Damage."

Dr. B. S. Adams, Hibbing, read a paper entitled "The Gall-Bladder as the Source of Focal Infection."

The Secretary, Dr. Carl B. Drake, presented a summary of the proceedings of the House of Delegates and of the Councilors, as follows: Your Secretary wishes to report a registration of 304 at this meeting out of a total membership of 1,649 (which is an increase this year of 101 over last year's membership).

The Treasurer's report showed that the income of the Association during the past year was about \$2,000.00 more than its expenses, and MINNESOTA MEDICINE was \$500.00 within the amount of its income and the amount appropriated by the State Association. The legal expenses were about \$1,200.00.

The House of Delegates met twice and the Council three times. The Council decided to revoke the charter of the Aitkin County Medical Society, as they requested, with the understanding that their membership would be transferred to the Upper Mississippi Medical Society.

The Council has decided to leave the pending suit of the former Brown-Redwood County Society against the State Medical Association in the hands of their law firm. This suit will go to trial in September.

The House of Delegates elected the following officers: President- Dr. J. Frank Corbett, Minneapolis; First Vice President, Dr. S. H. Boyer, Duluth; Second Vice President, Dr. A. W. Ide, Brainerd; Third Vice President, Dr. John Williams, Lake Crystal; Secretary, Dr. Carl B. Drake, St. Paul; Treasurer, Dr. F. L. Beckley, St. Paul; Councilor of the First District, Dr. C. E. Dampier, Crookston; Councilor of the Fourth District, Dr. R. J. Hill, Minneapolis; Councilor of the Seventh District, Dr. F. A. Dodge, Le Sueur; Delegate to the American Medical Association, Dr. J. W. Bell, Minneapolis; Alternate, Dr. F. L. Adair, Minneapolis.

It was decided to hold the next meeting in Minneapolis the second week in October 1922.

THE PRESIDENT: What will you do with this report presented by the Secretary?

DR. W. H. MAGIE: I move that it be adopted.

Seconded and carried.

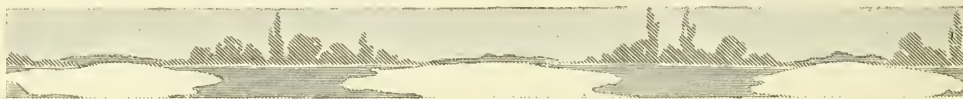
THE PRESIDENT: Is there any further business to come before the meeting. If not, a motion is in order to adjourn. I do not think, after the magnificent hospitality of the men of Duluth, that we should close this session without an expression of our gratitude to the medical profession of Duluth. I also want to emphasize the splendid success of this meeting. You all know that the papers were scholarly and well prepared, and the discussions admirable, and I do not see what more could be asked to make a complete success of our scientific session.

I think the men all over the state have a peculiar fondness for the medical men of Duluth. So far as I am personally concerned, that fondness extends from the time when I first came here and it has grown with the years, and I feel we would be leaving undone a very manifest duty not to have one of you gentlemen make a motion, and let it be carried, expressing our gratitude for the hospitality that has been extended to you.

DR. R. E. FARR: I would like to make such a motion as Dr. Riggs suggests.

Seconded and carried.

As there was no further business to come before the meeting, on motion, which was duly seconded and carried, the Association then adjourned to meet in Minneapolis the second week in October 1922.



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# MINNESOTA MEDICINE

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## ORIGINAL ARTICLES

### THE DIAGNOSIS AND TREATMENT OF CHRONIC LESIONS OF THE HIP JOINT\*

F. J. GAENSLEN, M. D.  
*Milwaukee, Wis.*

The title of this paper, Chronic Lesions of the Hip Joint, will perhaps suggest the pertinent questions—"Why single out the hip joint?" and "Are not all joints subject to the same diseases?"

As a matter of fact there are several conditions which are peculiar to the hip joint, so that it has seemed worth while to the writer to present a brief review of the diseases and conditions met with. For the surgeon especially trained in bone and joint surgery, there will be very little illuminating in my remarks, but the general practitioner, as a rule, does not see so many of these cases but what a brief presentation of the subject may be helpful, even if it does nothing more than summarize the important points in the differential diagnosis.

In spite of the fact that the hip joint is deeply seated and less readily accessible than most other joints, the lesions which it is subject to, can be fairly readily recognized. This does not imply that difficulties in diagnosis may not arise. Not infrequently diagnosis must be deferred until continued observation and study clear away doubtful points. In the great majority of cases, however, the statement that hip joint lesions are fairly readily recognizable does hold true. This is due in part to the comparatively limited number of chronic affections we have to deal with and in part to the well differentiated characteristics of these affections.

As in the study of any disease or condition,

a careful history is essential. In fact, in many cases this will enable one to make at least a tentative diagnosis. Physical signs, roentgenologic and laboratory findings all have their proper place, and, especially in the unusual case, should be considered in proper order. It is a good practice to defer study of the x-ray thrust at you by the patient who is very apt to think that this bit of evidence will settle all doubts as to the real nature of his trouble.

In the examination of hip lesions it is important to strip the patient completely and to conduct the examination according to a definite plan, just as the internist proceeds according to plan in the examination of a chest. Unless this rule is followed it is very likely that errors will occur. This is especially true in differentiation of lesions of the lower lumbar spine.

Inspection will disclose peculiarities in posture and gait, deviation from normal contour, awkwardness in removal of clothes or in getting on the examining table.

Palpation will determine the presence of muscle spasm, loss of normal muscle tone, elevation of surface temperature and tenderness. Measurement is necessary to determine the degree of atrophy, apparent and real shortening, disturbance in relation of Bryant's and Nelaton's lines. The determination of range of motion, active and passive, and careful recording of findings is important not only in establishing the diagnosis but also for purposes of comparison with future records. A few moments' consideration of the last point may be worth while. It is considered good practice to begin testing the range of motion on the sound side, and in children I have found it of help to count out loud to them while the various movements in flexion, abduction, adduction rotation, etc., are carried out to their limits with gentle continued effort. A crying child will often become quiet and listen

\*Presented before the Southern Minnesota Medical Association, Winona, Minn., June, 1921.

to the counting as though deeply interested and offer no voluntary resistance to these passive movements. Flexion is tested first. The left hand is placed under the patient's back to detect the slightest diminution in lordosis as the leg with extended knee is raised. This indicates the limit in flexion. This is estimated in degrees and the leg again allowed to come slowly to the table. All sudden movements are to be avoided. In testing for abduction the thumb and middle finger are placed gently on the anterior-superior spine, right and left, while the right hand carries the leg with the knee extended into gradually increasing abduction. When the pelvis begins to move the degree of motion is estimated. Adduction is similarly noted by carrying the limb in the opposite direction. Having thus gained the confidence of the patient similar movements are executed with the affected extremity. Since no force whatever is used in these tests the examination is without pain and can be quickly carried out. In making these tests the patient lies on his back on the table. For the determination of rotation, inward and outward, and hyperextension, it is best to have the patient in the prone position. Again beginning with the sound member, the leg is brought into the vertical position with the knee flexed at right angles resting on the table. The foot is now grasped and carried away from the median line and the degree of rotation inward estimated as soon as the pelvis tilts up on the opposite side. Rotation outward is determined by carrying the foot across the median line until the pelvis tilts up on the same side. The flat hard surface of the table serves to steady the pelvis and the tilt can be readily noted assisted by the fingers of the left hand on the anterior-superior spine of one or the other side. The leg, therefore, is used as a convenient indicator on the imaginary dial so that the range in degrees is easily estimated. This method of testing rotation, that is, with the patient in the prone position, so far as I know, has not been previously described. The advantage of the method outlined is that the degree of motion can be determined very accurately in the latter, while, with the patient in the supine position and the leg straight, rotation is less easily and less accurately determined. In addition there is a certain

amount of axial rotation at the knee joint in the extended position and in the tarsus which is misleading. Again, if the knee is flexed, the foot resting on the table, one is testing not rotation alone, but rotation combined with flexion and abduction.

The commoner lesions of the hip joint are tuberculosis, Perthes' disease and osteo-arthritis. These will be discussed in the order named, while conditions met with less frequently will be considered later.

Tuberculosis of the hip is so well known to you that little need be said regarding diagnosis. In children a chronic non-articular arthritis coming on insidiously, whether or not there are demonstrable lesions elsewhere, will prove to be tuberculous in the great majority of cases. A limp, often intermittent, is perhaps the most important sign, while pain not infrequently referred to the knee, due to the irritation of the obturator nerve is quite common. Limitation of motion in all directions is practically unfailing due to spasm of the muscles about the hip. It is important to note that this limitation of motion is readily appreciable even at an early date and that it is about equal in all directions.

The tell-tale night cries result when these muscles are off guard during sleep and allow excessive movement of the tender joint. Perhaps the first muscles to be affected are the psoas and iliacus, spasm of which is responsible for the flexion deformity. This is best demonstrated by the inability of the patient to lie on his back with the lumbar spine and the back of the knee touching the table at the same time. If, on the other hand, hyperextension of the hip is possible to a normal degree tuberculosis may be definitely ruled out. I have not found this rule to fail. When the disease starts in the trochanter or neck at some distance from the joint, this uniformity in limitation of motion is lost. Technically these cases are not tuberculosis of the hip joint and would be excluded from consideration by the title of this paper. Clinically, however, they must be kept in mind and differentiated from true hip joint lesions.

The determination of actual and apparent shortening and of atrophy of the calf and thigh which is a constant and early sign is important. Temperature record and tuberculin tests also



are of aid in doubtful cases. Sinuses and abscesses occur at a stage when the question of diagnosis can no longer be a troublesome one.

The x-ray evidence is very valuable. The contour of the bone in early cases is interfered with little if any, but there is a haziness of the bone about the lesion so that the picture is often regarded as unsatisfactory. Repeated efforts yield no better results, though the sound joint taken for comparison shows the cancellous structure of normal density. The actual focus of disease is represented by irregular, fluffy, poorly circumscribed, darker areas. There is no periosteal thickening. Bone production occurs only in the very late stages when the processes of repair have been well under way. The presence of bone hypertrophy in the early or moderately advanced stages should lead to suspicion of lesions of other nature. Tuberculous lesions of the lumbar vertebrae are not infrequently mistaken for hip disease. An early lesion in this location is only rarely demonstrable in the x-ray. Spasm of the iliopsoas on one or both sides with consequent flexion deformity at the hips, and tilting of the pelvis and decided limp are frequent. The absence of local tenderness about the hip and freedom of motion in all directions, except extension, will eliminate a hip lesion. As a rule there will be tenderness over the lower spine and marked restriction of motion in spinal movements in the lower lumbar segment. Tuberculous lesions of the sacroiliac joint are comparatively rare. Here too there will be freedom of motion in the hips in all directions except in flexion and extension because of spasm of psoas and lumbar muscles while on grasping the crests of the ilia and making lateral compression of the pelvis there will be pain, locally or referred down the leg. Except in late lesions x-ray findings are frequently negative due to the thickness of the bone and the irregular conformation of the joint.

The essentials in treatment are adequate fixation in plaster or brace and relief from weight bearing, the surgeon relying on the particular form of fixation which he is best able to carry out. In children operative measures are indicated only in exceptional cases, while in adults operative ankylosis of the joint or arthrodesis,

in other cases resection, may be called for when conservative treatment fails.

In the foregoing, emphasis has been laid on the fact that in tuberculosis the limitation of motion is fairly uniform in all directions. This is an aid in differentiation of Perthes' disease, a more benign self limited affection. In Perthes' disease the limitation in motion is in abduction and frequently also in rotation outward while other motions remain free. This condition has attracted a great deal of attention within recent years. Calve in 1912 had collected a group of ten cases most of which had been treated for tuberculosis for some time but which differed from tuberculosis in several important features. As in hip disease, the lesion is a chronic one and usually unilateral, but the symptoms are of decidedly milder type. Pain and limp are comparatively slight even in the absence of fixation by protective apparatus. Atrophy is less marked even in long standing cases and the disease is practically self limited. The x-ray findings are also very characteristic. It is a disease practically confined to children between the ages of five and ten. Calve described these cases as pseudocoxalgia to differentiate them from coxalgia or hip tuberculosis. Legg of Boston reported a number of cases prior to this as "an obscure affection of the hip joint" but it was not until Perthes' classical description of the condition in 1913 that wide-spread interest was aroused and that cases were more generally recognized. It has therefore come to be known in the literature as Perthes' Disease, or Osteochondritis Deformans Juvenilis, the name proposed by Perthes in his original publication.

The etiology of this condition is still obscure. Nutritional disturbances, mild infections, imperfect osteogenesis, and even syphilis have been regarded as the important factors.

The roentgenograms in these cases show characteristic changes in the epiphysis of the head of the femur. The contour of the epiphysis suffers decided change. There is an irregular flattening of the rounded head apparently due to a crumbling or fragmentation of the epiphysis. The neck is frequently broader and shorter than on the normal side. Strangely enough this lesion affects no other joint in the body. A possible exception to this is the astragalus. Within

the past few years a number of cases of isolated disease of the astragalus have been described, with x-ray and clinical findings analogous to Perthes' disease.

Treatment consists of protection of the joint by plaster cast or at the onset, if the discomfort is considerable, by traction for a week or two followed by plaster. In very active children this may have to be continued longer, in order to prevent more marked deformity of the head. The clinical course will have to guide one as to the duration of fixation while x-ray at intervals will also be helpful to determine the progress of the condition. Only a few cases have been observed into adult life, and it is a question just what permanent changes will result. The view has been expressed and it is entirely likely that these cases may predispose in the aged to osteoarthritis.

In the consideration of hip lesions in patients past middle life, first place should be given a condition variously known as osteoarthritis, senile coxitis, hypertrophic arthritis or arthritis deformans of the hip. The essential feature is a bony deposit about the margins of the head and acetabulum. This condition deserves emphasis for two reasons, first, because it is probably the most frequent hip lesion met with in adults past middle life, and second, because it is not recognized as generally as it should be. The term senile coxitis is misleading since the date of onset of the trouble in not a few cases may be placed in the late thirties or early forties. In a great majority of cases, however, the onset occurs after the fifth decade. The condition is characterized by a very insidious onset and a chronic progressive course. Pain is one of the earliest and most important symptoms. It may be local or referred to the groin, trochanter region or down the back of the thigh due to the involvement of the nerves supplying the hip joint. Occasionally there is paresthesia or tingling rather than pain along the same route, while now and then there may be a sudden catch in walking or on movement of the thigh, even while lying down, presumably due to impingement of the thickened femoral head against the borders of the acetabulum. Stiffness, most marked in the morning, or during the first few steps after sitting for some time,

is often noted. After being about for a few minutes the joint is said to limber up only to have the symptoms aggravated later in the day because of continued use. The absence of pain on resting the joint is of value in diagnosis. The hypertrophy of bone is especially apt to occur at the outer and upper borders of the femoral head and the contiguous portions of the acetabulum. The position of adduction is therefore assumed to prevent impingement of these processes, one against the other. Apparent shortening and consequently a limp, varying in degree with the degree of adduction must necessarily result. In older cases, not infrequently, there is also a real shortening due to erosion of the acetabulum as well as to a flattening of the head of the femur. Motion is distinctly and markedly limited. As a rule, however, certain motions appear to have escaped restriction and are normal in range. This distinguishes it rather easily from tuberculosis. As a rule abduction is the most interfered with while adduction may be perfectly normal. Likewise, rotation inward is apt to be more free than rotation outward. Creaking of the hip joint on motion, often unaccompanied by pain is occasionally met with and may be audible at some distance from the bed. Atrophy of the muscles of the thigh and leg is comparatively slight even in long standing cases, while in tuberculosis this atrophy is very early and more marked. The trochanter may appear rather thickened on palpation but there is no infiltration, no boggianness of the skin or tenderness about the joint on palpation. Constitutional symptoms are absent. Occasionally other joints show similar changes, notably the terminal finger joints, the Heberden's nodes and recognition of these will be of material assistance in making the diagnosis. The x-ray findings are characteristic. At the margins of the articular cartilage there is an increased deposit of bone or a lipping and at the point of attachment of muscles there are frequently hook-like processes. In places there is increased density of the bone and the outlines are sharp giving a good contrast in the roentgenogram. While the clinical signs in themselves are sufficient to distinguish the condition, the x-ray will remove the last doubt.

Exposure to cold and damp, also chronic in-



fections, have been regarded as predisposing. It is well recognized that trauma, either a single severe injury, or often repeated lesser insults, are likewise influential. The fact that males are more frequently afflicted than females, lends weight to trauma as a factor. Mr. R. Llewellyn Jones has pointed out "that the clinical appearance presented by osteoarthritis of the hip in its more advanced stages may closely simulate those met with in impacted fractures of the neck of the femur and when we bear in mind the insidious onset of the disease it is easily seen how readily an error in diagnosis may take place in such a case when an intercurrent-injury, involving the previously diseased joint has occurred."

The ultimate result in cases of osteoarthritis is very marked disability due to increasing adduction and flexion deformity and increasing limitation of motion. If the limitation of motion would progress to complete fixation, one could at least assure his patient that in this final stage pain would be relieved, but unfortunately ankylosis never becomes complete. A very limited range of motion and with it pain persists. It has been well said of this disease "it sadly embitters, but it does not shorten the duration of life."

The condition is very frequently mistaken for sciatica. It may be well here to emphasize the fact that true sciatica is really a rare affliction, and that most of the conditions termed sciatica depend upon lesions of the sacroiliac or lumbosacral joints. Practically the only motion interfered with to any extent in sciatica is flexion-Kernig's sign. Abduction is usually free, inasmuch, as this does not cause tension on the nerve trunk.

The treatment is very unsatisfactory. Rest and baking are of value in relieving pain. In severe cases some light appliance restricting motion to the painless range may be recommended. Operative removal of the bony outgrowths or even arthrodesis of the joint may be indicated in special cases. Recently Sir Robert Jones has recommended forcible manipulation under anesthesia, stating that freedom from pain for several years is not unusual.

Tabetic arthropathy of the hip is comparatively rare. The signs presented are those char-

acteristic of Charcot joints elsewhere, namely, limp, general enlargement of the joint and comparative freedom from pain. The marked relaxation of the capsular structures allows abnormally free mobility. The coarse, crunching sensation on motion gives evidence of marked destruction of the joint. The thing which impresses one most in these cases is the astonishing freedom from pain and slight interference with function in view of the tremendous joint destruction. The x-ray shows processes both of destruction and proliferation, the latter often predominating. With exception of the knee, Charcot's disease affects the hip more frequently than any other joint. It is said that in about 20 per cent of the cases the joint symptoms precede the tabetic condition. In these cases the diagnosis may be less readily made, but should offer no special difficulty in view of the well defined characteristics of the condition.

Of other forms of neuropathic arthritis of the hip, the only one met with by the writer was one in connection with spina bifida. In this case there was marked destruction of the femoral head and "wandering" acetabulum, without bone proliferation. Syringomyelia is so rare that it is merely mentioned in passing.

Coxa vara is another condition to be kept in mind in the differential diagnosis of hip lesions.

The term "coxa vara", it will be recalled, is applied to that condition in which the neck of the femur is bent downward, so that the angle formed by the neck and the shaft approaches the right angle. Normally this angle should be about 135 degrees. There are various types of this deformity, the rachitic, the traumatic following partial separation of the epiphysis of the femoral head with imperfect reduction and the adolescent in which the alteration is due to disturbance of growth as a result of trauma of weight bearing at the epiphyseal line, resulting in the deformity referred to.

The differentiation of these various forms is usually not difficult from history and physical findings as well as x-rays.

Congenital dislocation of the hip deserves only a word in passing. There is a history of limp from earliest childhood. Absence of pain and muscle spasm are important and the x-ray shows the head displaced above the level of the

acetabulum. The amount of displacement can be roughly measured by the break in what has been called the diagnostic line.

Pathological dislocation, by which is meant dislocation of the head of the femur out of the acetabulum as a result of acute septic arthritis, is not a very rare condition. It is usually a sequel to acute infections e. g. otitis media, tonsillitis, etc.

Perhaps it may not be out of place to state that in the majority of cases these dislocations are preventable by continued traction. The dislocation is very apt to occur as the result of the marked distention of the capsule by inflammatory exudate, associated with abnormal position maintained because of extreme pain. The thigh is usually drawn upward and rotated inward so that dislocation of the head over the posterior edge of the acetabulum occurs not infrequently. This is facilitated by the effect of gravity, the more or less perpendicular position of the thigh in marked flexion during recumbency favoring the pushing of the head downward and out of the socket. Muscle spasm, in addition, has a further tendency to pull the head out of the socket from this predisposing position.

Several instances are recalled of subacute monarticular arthritis of the hip of non-tuberculous origin in children in which tuberculosis had to be seriously considered in establishing the diagnosis. In these the comparatively recent origin of the disease and the complete freedom of motion in certain directions were the essential points upon which the decision against tuberculosis rested. Recovery followed a comparatively short period of traction.

A number of miscellaneous affections, osteitis fibrosa of the neck of the femur, chronic inflammatory conditions of bursae about the hip joint, sarcoma of neck and trochanter and also congenital malformation have been encountered. In all of these the clinical signs have been sufficient to exclude any of the conditions mentioned. In many of these the x-ray has come to the rescue in establishing the final diagnosis.

#### DISCUSSION

DR. H. S. HENDERSON, Rochester: Dr. Gaenslen's paper is very broad and comprehensive; it covers many important points, any one of which would make an interesting subject for discussion. I

wish to thank him personally for presenting the subject, because there are probably more errors made in the diagnosis of hip joint troubles than any other joint. I will speak of a few points that are of practical importance. When a patient comes to us for examination he should be completely stripped. A patient comes into the office and because of a stiff hip cannot get his shoe off, he slips his combination underwear down a little, and you try to examine him. The amount of limitation of motion cannot be estimated with the patient in this condition. It is better, so far as range of motion is concerned, to examine for motion with all his clothes on.

Dr. Gaenslen spoke of pain in the knee in cases of tuberculosis of the hip. All too frequently we see casts on the knees of patients who have tuberculosis of the hip. Patients with Perthe's disease usually recover within a year. Probably the patients we think we cure early do not have tuberculosis of the hip joint; it may take five or six years to bring about a cure in such cases.

We see also too often patients whose cases have been diagnosed osteoarthritis, and hypertrophic arthritis of the hip when they have fracture of the hip. Every hip joint injury should be examined by the roentgen-ray.

## STUDIES ON THE RESPIRATORY ORGANS IN HEALTH AND DISEASE\*

### III. THE VALUE OF VITAL CAPACITY READINGS IN CLINICAL MEDICINE.

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Hutchinson in 1846 gave a description of the spirometer which he had invented and pointed out its extreme value in the diagnosis of early pulmonary tuberculosis. Probably because instruments of this kind were not made available sight was apparently lost of vital capacity work for a long time, except for an occasional investigator, such as Arnold (1855). Recently, however, the value of lung capacity readings is being more appreciated and one is safe in predicting that the time is not far distant when such readings will be looked upon as an indispensable part of every complete physical examination.

After making a careful study of the Importance of Vital Capacity in Thoracic Surgery,

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Graham (1920) arrived at the following conclusions:

"Determination of the vital capacity by means of a spirometer, when used in connection with the mathematical expression given in the text, will indicate approximately the maximum opening in the chest wall compatible with life, if the mediastinum is not already stabilized by adhesions and induration. If such observations are made before establishing open drainage in cases of empyema or before any thoracic operation, doubtless many lives will be saved. Both theoretical conclusions and actual observations show that in empyema the vital capacity is greatly reduced. That this reduction does not depend merely on the presence of the fluid exudate in the pleural cavity is shown by the fact that an appreciable increase in the vital capacity occurs only gradually after the removal of the exudate. This fact is of importance in being an additional argument against the establishment of an open drainage during the acute pneumonic stage of an empyema when the vital capacity is so low as to approximate the tidal air requirement. Extensive thoracoplastic operations result in apparently a permanent marked reduction in the vital capacity. They should be employed, therefore, only in the rarest instances and only after other methods have been given an intelligent trial for at least many months."

Peabody and Wentworth ('17) Ulrich and Nathanson ('21) and others have shown that in cardiac disease vital capacity readings are of great value not only in diagnosis but also in guiding the patient's activities and in rendering a prognosis.

In diseases of the lungs such as tuberculosis, abscesses, asthma, bronchiectasis and pneumonia, Hutchinson ('46), Arnold ('55), Peabody and Wentworth ('17), Garvin, Lundsgaard and Van Slyke ('18), Dreyer ('19), Dreyer and Burrell ('20), Wittich, Myers and Jennings ('20), Myers ('21) and many others have found the vital capacity readings a great aid not only in diagnosis of early disease but also in ascertaining the amount of damage done to the lungs and the effect of different kinds of treatment.

In this connection I cannot help but call attention to one of Hutchinson's very striking cases:

"The most interesting case is that of Freeman, the 'American Giant'. This man came over to England in 1842 and, in the November of that year, trained for a prize fight; I examined him immediately before his *professional engagement*, when he might be considered in the 'best condition'. His powers were as follows: Vital capacity, 434 cubic inches; height 6 ft. 11 in.; weight 19 st. 5 lb.; ————. In Novem-

ber, 1884, exactly two years afterwards, he came to town in ill health. I then examined him in the same way as before, twenty times at various intervals, during which his vital capacity varied from 390 down to 240, and the mean of all the observations was 344 cubic inches, a decrease of 90, or more than 20 per cent; ————. At this time I took him to two physicians well skilled in auscultation, and they both affirmed that they could not detect any organic disease. After January 1845, I lost sight of Freeman, and, in the October following, I was kindly favored with the following account of him from Mr. Paul surgeon to the County Hospital, Winchester. 'Freeman was admitted into this hospital on the 8th of October, in an extreme state of debility and exhaustion; he was reduced almost to a skeleton, complained of cough, and was expectorating pus in large quantities.——— Freeman after death measured 6 feet 7½ inches, weighed 10 st. 1 lb. On opening the chest, the lungs on both sides were found adhering by their apices to the superior boundaries of the thorax, and studded throughout their substance with tubercles. The tubercles, on the whole, were much less numerous in the right lung than in the left; both lungs were nearly healthy at their base; the tubercular matter gradually increased in quantity towards their upper parts, and the apices of both lungs were almost completely occupied by large cavities partly filled with pus, and capable of containing two or three ounces of fluid each. The heart was remarkably small. The rest of the viscera appeared healthy.' ———— The spirometer was useful to me in this case, by indicating the commencement of the disease which ultimately caused his death, and that before the usual means availed."

Personally I have found the lung capacity test very valuable as it has been possible to go through large wards during epidemics of such diseases as paratyphoid and influenza and by means of the spirometer pick out the cases which further clinical data proved to be developing pneumonia. Moreover, it has been possible to visit sanatoria for the tuberculous, take the vital capacity readings, age, weight, height and previous occupation of the patients and classify them into the various stages of the disease with a reasonable degree of accuracy. It should be made clear however that the lung capacity test is not infallible but that it is a distinct aid and is worthy of a part in every completed physical examination.

The great advantage of this test is that it requires little or no previous training for its performance and the instrument is simple and easily portable, thus making the test possible in any place under most all conditions. It has been

pointed out by other investigators that the vital capacity test does the patient no apparent harm even in case of active pulmonary tuberculosis. It would seem, however, that this test better be postponed for a few weeks in cases of hemoptysis.

There are many spirometers on the market at present but I have found none more accurate and more satisfactory in every particular than the Sanborn spirometer made according to the specifications of Peabody and Wentworth ('17).

The approximate normal vital capacity for individuals must be known before the readings are of much significance in the diagnosis of diseases of the chest. Therefore the normal vital capacity for men and women of average physical fitness has been computed according to the mathematical formula of Dreyer ('19). The results of these computations have been arranged in table form (Myers '21) thus making them available for clinicians and research workers. The use of such tables saves a tremendous amount of time. The normal vital capacity varies considerably with such factors as obesity, age, occupation and previous physical training and experience. For example, an obese patient usually has a lower lung capacity than a person whose normal weight is the same and who is of the same age and past physical training and experience. After the age of fifty years there is usually a gradual decline in vital capacity. A person who indulges in athletics, plays a wind instrument or takes other strenuous exercise will have a greater vital capacity than one who leads a very quiet and inactive life. All these factors must be given due consideration in the use of the vital capacity table.

After this table was completed it was found (Myers '21) that the vital capacity of men and women weighing between 100 and 180 pounds could be calculated by two very simple empirical formulae as follows:  $17.6 \times \text{body weight} + 900 = \text{vital capacity (women)}$ ;  $21.2 \times \text{body weight} + 1168 = \text{vital capacity (men)}$ . The figures obtained by the use of these formulae are sufficiently accurate for routine clinical work and may be used to advantage in the absence of vital capacity tables.

A short series of cases will serve to illustrate the value of spirometer readings.

*Case I.* This man of 25 years came in complaining of slight loss of strength, considerable expectoration and a slight cough. Physical examination revealed moderately coarse rales at the base of the left lung. His vital capacity was found to be 2500 cubic centimeters, his height was 168 centimeters and his weight was 115 pounds. A glance at the table of normal vital capacities showed that a man of this weight should have a vital capacity of 3609 c. c. When the physical fitness was computed he was found to be 32 per cent below normal. This patient was immediately sent to the x-ray laboratory. The x-ray report read as follows: "Stereoscopic plates of the chest show a definite bronchiectasis in the left lower lobe. There are a few calcified tubercles in the left apex. Conclusions—healed tuberculosis in the left apex. Bronchiectasis left base."

*Case II.* A woman of 29 years came in on Feb. 11, 1921. She gave a history of slight cough since a cholecystectomy which was done in October, 1920. In the meantime she had a rather severe attack of typhoid fever and had also lost considerable weight. A few weeks before she had been seen by two chest specialists who were unable to find any physical signs of tuberculosis. On February 11th a few rales could be elicited in the first interspace on the right side. Her weight was 101 pounds and her vital capacity was 1900 cubic centimeters. A glance at the table of normal vital capacities showed that she should have a capacity of 2668 cubic centimeters. Her vital capacity therefore was 768 cubic centimeters below normal. After each of the relatives had taken a turn at blowing the spirometer there was no difficulty in convincing them that there was a cause for the reduced lung capacity of the patient and that cause was most likely disease of the lungs. This patient, however, was sent to the x-ray laboratory where the stereoscopic plates showed "a small but definite parenchymal type of tuberculosis in the first and second interspaces on the right side and some bronchial gland enlargement on the left side. Conclusions: Pulmonary tuberculosis in the right upper lobe, calcified bronchial glands on the left side." Unfortunately the lack of sanatorium capacity made it impossible for this patient to be admitted for about a month during which time she did not receive the best of home care. Stereoscopic plates were taken immediately after her admission to the sanatorium where the roentgenologist's conclusions were "Probable tuberculosis infiltration in apices of both lungs."

*Case III.* This patient is a woman of 49 years weighing 135 pounds. She has suffered from bronchial asthma for more than a decade. Her treatment was begun in January 1921, and she has had no sign of asthma since Feb. 1, 1921. Although three months have elapsed since her asthma disappeared, we now see her vital capacity is 2100 cubic centimeters when the table of normal capacities shows that she should have a capacity of 3288 cubic centimeters. In this case the physical examination and



x-ray reveal a severe grade of emphysema which unquestionably is the chief factor in decreasing the lung capacity.

*Case IV.* This young man of 21 years developed a slight cough about three weeks ago. Otherwise he had apparently been in good health. The day before he came for examination, however, he had a slight hemoptysis. The physical examination revealed a slight lagging over the left infraclavicular region. There was no demonstrable change of tactile fremitus, but the percussion note was very slightly impaired both above and below the clavicle on the left. On auscultation a few fine rales were elicited on the left side down to the level of the second rib. Posteriorly there were no abnormal physical findings. This patient is 6 feet tall and weighs 157 pounds. His lung capacity is 5400 cubic centimeters. The vital capacity table shows that the normal capacity for a man of his weight is 4515 cubic centimeters. On first thought one would be tempted to conclude that this patient's chest was clear; however a further series of questions revealed the fact that he had been a wind instrument player over a period of four or five years, and had formerly indulged quite extensively in long distance running. His lung capacity, although much above the average for a man of his size was probably reduced. He was therefore sent in for stereoscopic plates of the chest which showed a "pulmonary tuberculosis involving both upper lobes, being more marked on the left side." This case is cited only to show the possibility of error in diagnosis from lung capacity readings unless one carefully inquires into the patient's past physical development.

*Case V.* This young man became acutely ill and was admitted to a hospital during the recent paratyphoid epidemic at the University of Minnesota. His symptoms were very similar to those of the patients suffering from paratyphoid. It happened that vital capacity readings were being taken on all patients acutely ill in the hospital on the same day. This patient's capacity was found to be 2100 cubic centimeters which was nearly 1800 cubic centimeters below the average vital capacity for a man of this weight. The physical examination revealed beginning pneumonia. I have had other pneumonia patients whose vital capacity revealed disease before any physical signs of pneumonia could be elicited.

*Case VI.* This girl of 18 years gave a history of an attack of pneumonia about 9 months ago. She failed to completely regain strength, develop persistent cough and expectoration. She was then sent to a sanatorium for the tuberculous but repeated examinations of the sputum revealed no tubercle bacilli. The x-ray plates showed a dense shadow in the left basal lobe which was interpreted as representing an abscess. When first seen a few weeks ago her lung capacity was 2000 cubic centimeters and her weight was 101 pounds. The average vital capacity for a woman of this weight is 2668 cubic centimeters. We see her lung capacity is still further decreased at

present. This is in part due to the fact that she is now receiving artificial pneumothorax treatment.

*Case VII.* This man came in complaining of dyspnea, edema and cardiac arrhythmia. He now weighs 167 pounds and is 5 feet and 10 inches tall. The physical examination reveals a mitral regurgitation and auricular fibrillation. The lungs are clear except for signs of slight passive congestion. There is mild edema of the lower extremities and moderate ascites. This patient's lung capacity is 1700 cubic centimeters which is less than one-half the average capacity for a man of his age and weight. Thus it is evident that the vital capacity of an individual is markedly reduced in cardiac lesions particularly after decompensation begins.

*Case VIII.* This patient presents a case of converse nature. She came in a few months ago giving a history of having been somewhat intimately associated with a relative who had recently died of pulmonary tuberculosis. Her weight had decreased from 148 to 106 pounds and she showed a marked loss of strength. Her lung capacity was found to be 3400 cubic centimeters which is 762 cubic centimeters more than the average lung capacity for women of the same weight. No physical signs of pulmonary tuberculosis could be elicited. The relatives insisted, however, that x-ray plates be made. This was done immediately and the report was as follows: "Stereoscopic plates of the chest show no evidence of pulmonary tuberculosis or other pathology." Further study of symptoms, physical examination and basal metabolism tests revealed that the patient was suffering from thyrotoxicosis.

Dreyer and Burrell ('20) pointed out "that with loss of weight a vital capacity definitely abnormal when calculated in relation to the normal weight of the person might appear normal if calculated in relation to the reduced weight during disease." In emaciated patients therefore the normal weight should be ascertained and the vital capacity calculated for this weight rather than for the actual weight of the patient. This patient's vital capacity calculated for her normal weight was still above the average.

The following three cases illustrate variations in vital capacity due to previous physical development, obesity and senility.

*Case IX.* This man of 29 years is 6 feet tall, and weighs 175 pounds. Before entering college he did much hard labor. He also earned his way through medical school. While in high school he took an active part in athletics. In the University he played on the Varsity foot ball team and took an active part in other forms of athletics. He is also a wind instrument player. His lung capacity is now 6800 cubic centimeters which is 2083 cubic centimeters above

the average for a man of this size. It is therefore obvious that this man could have a considerably decreased lung capacity and still be above the recognized normal. This case serves to emphasize the necessity of carefully inquiring into the past physical experiences of every patient whose lung capacity is apparently normal or above.

*Case X.* About 10 months ago this lady of 40 years was told that she had active pulmonary tuberculosis. She then weighed 127 pounds but she immediately reduced her activities to a minimum and started on the home treatment for tuberculosis. When I first saw her about 3 months ago she was very nervous due to worry concerning her physical condition. Physical signs revealed no evidence of pulmonary tuberculosis nor did she have any of the cardinal symptoms of that disease. In view of the fact that she had been told that active tuberculosis existed she went into the x-ray laboratory, but the roentgenologist's report was as follows: "Stereoscopic plates of the chest show the diaphragm shadows clear on both sides, no evidence of fluid in either chest. There is no evidence of pulmonary tuberculosis or other infiltration or consolidation of the lungs." The patient now weighs 165 pounds and, as we see today, has a lung capacity of 2800 cubic centimeters. This capacity is somewhat below the average for normal women of her weight and age, but attention must be called to the fact that she is 17 per cent over weight. Hutchinson (1846) called attention to the fact that after a patient becomes 7 per cent or more over weight the vital capacity is decreased. From the history of this patient together with her present lowered lung capacity an error could easily be made in diagnosis unless an extremely careful examination were made. So far as the history is concerned she may have had a slight pulmonary lesion 10 months ago. If so, it has so completely cleared up as to leave no evidence of its existence. So far as the lowered vital capacity is concerned her tendency toward obesity is sufficient to account for the decrease.

*Case XI.* This man of 72 years, 5 feet 6.5 inches tall, and weighing 137 pounds, has devoted his entire past life to farm work. He has never been seriously ill. Physical examination reveals no cardiac or pulmonary pathology except senile changes. His vital capacity today is 2800 cubic centimeters which is considerably below the average for men of his weight. He is in the senile period of life which explains his reduced vital capacity.

#### SUMMARY

From the foregoing observations it is obvious that such diseases of the lungs as tuberculosis, bronchietasis, pneumonia, emphysema and abscess materially reduce the patient's vital capacity. Cardiac disease with decompensation also reduces the lung capacity. Therefore in diagnosis of chest diseases spirometer readings are

extremely valuable. Such readings are also very helpful in rendering a prognosis, in guiding a patient's activities and in ascertaining a patient's physical fitness from time to time.

A decrease of 10 per cent in lung capacity is ordinarily of no diagnostic significance; a reduction of 12 to 15 per cent makes the case somewhat questionable; while a decrease of 15 per cent or more (barring obesity and senility) usually indicates cardiac or pulmonary disease.

There are certain pitfalls, however, which must be carefully avoided in the interpretation of lung capacity readings. From previous physical experience the patient may have developed a lung capacity much above the average for persons of his size. In such cases a careful history is of great help. The obese individual usually shows a lower lung capacity than a normal individual of the same weight. This decrease in vital capacity may become noticeable when the weight is 7 per cent or more above the normal. After the age of 50 years there is usually a gradual decrease in lung capacity. In emaciated patients the normal weight should be ascertained and the normal vital capacity calculated from this rather than the actual weight.

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## THE VALUE OF THE OPHTHALMOSCOPE IN DIAGNOSIS\*

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My reason for bringing this subject before you this evening is the manifest need for a more extended use of the ophthalmoscope by the general practitioner of medicine. The advent of the electric ophthalmoscope has made the examination of the eye grounds so simple and easy to perform that there no longer exists a valid reason for the non-employment of this valuable diagnostic measure.

There is no histology in the body which bares itself in such nakedness to the examining eye as does the tissue of the retina; no blood vessels so exposed to minute investigation. And it is because these vessels reflect the condition of the general vascular system and because the tissue changes are a guide to the changes occurring throughout the organism that we have the chief reasons for the unique position held by a study of the eye grounds in the field of diagnosis. Furthermore, ophthalmoscopy by the direct method magnifies the picture about twelve diameters thereby permitting the most searching examination of the fundus details.

Degenerative changes in the system such as occur in arterio-sclerosis can be detected by the ophthalmoscope, therefore, frequently earlier than is possible by any other method. Albuminuric retinitis and diabetic retinitis are sometimes the first signs that point to the correct diagnosis. Only a few weeks ago a woman

complaining of failing vision, presented herself at the eye clinic. The ophthalmoscope revealed a retinitis diabetica; the patient was in ignorance of any systemic disease. It is possible for any oculist, who uses the ophthalmoscope routinely in the course of examinations for the correction of refractive errors, to match this experience with similar ones. The diagnosis of syphilis is strongly suggested by the fundus picture to be described later, in fact, doubt may be cast on the accuracy of repeatedly negative Wassermann tests, in the presence of these findings. Tuberculosis sometimes produces characteristic alterations in the eye grounds, which may be of diagnostic value when the extra-ocular signs are not clear.

It is not my desire to give you the impression that a positive diagnosis can be made solely from the ocular lesions. They always call for other tests; a urinalysis and a Wassermann should be made in every case.

*Changes in the eye grounds due to arteriosclerosis.*—Arteriosclerosis is evidenced in the retina by early and late signs. Among the earlier changes we may note the following: great tortuosity of the small arterial twigs, called by DeSchweinitz, "corkscrew tortuosity"; irregularity in the calibre of the vessels; narrowing of the arteries; loss of transparency of the vessel walls; hyperemia of the nerve head; flattening or indentation of the veins where crossed by arteries (Fig. 1). Among the later changes there are included: hemorrhages into the retina; occlusion of the central retinal artery; thrombosis of the central retinal vein or its branches; and perivasculitis which manifests itself as white lines bordering the vessels (Fig. 2).

Degenerative changes of varied character sometimes occur. These sketches, (not shown here) drawn by the author from the eye ground of a female aged 62, suffering with arteriosclerosis, portray a unique degenerative change of the retina with the deposit of highly refractile bodies (cholesterin crystals) in a large area in the macular region. They also reveal many of the vascular alterations described above, such as corkscrew arterial twigs, indentations of the veins and narrowing of the arteries.

\*Presented before the Ramsey County Medical Society December 27, 1920.

Hemorrhages into the retina due to arterio-sclerosis are of prognostic significance; they are followed by cerebral apoplexy in more than 50 per cent. Thrombosis of the central retinal vein or of its branches has a like prognosis; of 17 patients observed by Geiss, ranging in age from 40 to 70, with marked retinal arterio-sclerosis, all suffered attacks of apoplexy within 4 years.

I am able, fortunately, to present a clinical case of thrombosis of the central retinal vein for your consideration this evening.

Mrs. V. B., aged 52, suddenly lost the vision of left eye 14 months ago. Family history: mother died of pulmonary tuberculosis 27 years of age; otherwise negative. Past history: has always been well until 14 years ago when there began to occur what she describes as hot flushes, the face assuming at these times, a purplish tinge. These attacks were excited by various emotions such as surprise, chagrin, etc., and by exertion. They have become more noticeable during the past few years. History of present illness: The loss of vision of the left eye 14 months ago was accompanied by no pain. She discovered it accidentally when some object happened to intercept the vision of the opposite eye. She applied for treatment at the eye clinic Jan. 20, 1920, a number of weeks later. Eye findings: At this time the left eye ground revealed numerous hemorrhages throughout, obliterating for the most part the details of the fundus. Here and there a dark, turgid, tortuous vein would appear only to bury itself again under another hemorrhage a little further on. Occasional spots of grayish exudate were to be seen. The outline of the papilla was lost, its position being inferred from the convergent direction of the vessels and the striations of hemorrhages. Vision was reduced to the perception of hand movements. Course: She was observed at intervals, there being noted from time to time a gradual clearing of the retina through absorption of the hemorrhages and slight improvement of the vision (up to the perception of fingers at 8 feet). Now and then fresh isolated hemorrhages would occur from one of the larger venous branches. The last one was noted on Nov. 30, 1920, about one month ago; this was from the superior temporal branch. At the present time you will observe that the veins are slightly narrowed and noticeably light in color (Fig. 2). At a point along the superior temporal branch, about 2.5 disc diameters from the papilla, a sudden tortuosity occurs. At a similar point on the inferior temporal branch a like phenomenon is noted, this one being more pronounced and reminding one of the convolutions of the renal glomeruli. At this point also, a new anastomosis is to be seen. The arteries are so narrowed as to be almost invisible and in places are entirely obliterated and

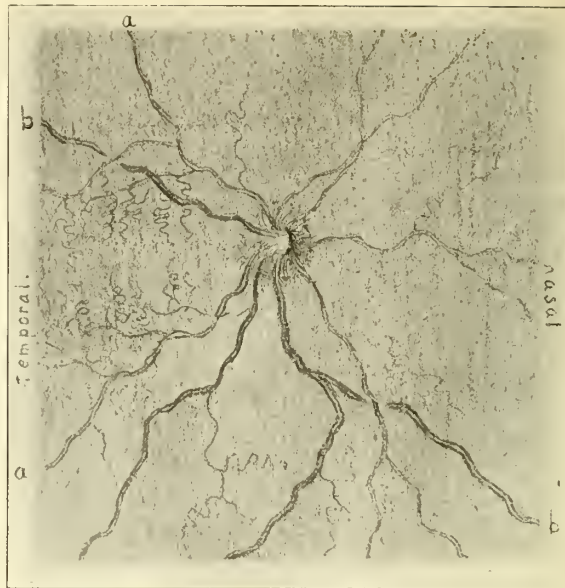


Fig. 1. Sclerosis of the Retinal Vessels. Note the corkscrew like tortuosity of the small arterial twigs especially in the region of the macula; the irregularity in caliber of the vessels; the indentation of the veins where crossed by arteries (superior temporal and inferior nasal); the injection of the papilla and slight blurring of its margins.

replaced by white lines; note particularly the superior temporal artery. Vitreous opacities slightly blur the details but faint light spots are to be seen in the macular region. There is no likelihood of future improvement in the vision because of the interference with the nutrition, and resulting atrophy, of the retina. Hemorrhages may recur indefinitely and secondary glaucoma may supervene. Blood pressure findings Jan. 20, 1920 were systolic 200, diastolic 115. Present findings are about the same.

*Changes in the eye ground due to chronic Bright's disease.*—Albuminuric retinitis is characterized by the presence of white or yellowish spots in the retina, hemorrhages, edema, and blurring of the outline of the disc. These changes occupy particularly the region surrounding the papilla. The white spots may coalesce forming large irregular patches. The so-called typical picture includes the stellate figure at the macula which consists of radiating white lines and spots having the fovea centralis for its center. This figure, however, is not present in all cases and must not be considered essential to a diagnosis. The nerve head is involved in various degrees of swelling; when noticeable the picture is termed neuro-retinitis albuminurica. Cases of albuminuric choked disk occasionally occur.



The prognosis is poor. It is rare for one to live longer than two years after the development of a retinitis albuminurica; this of course, does not apply to those benign forms such as occur in pregnancy and in scarlet fever.

Figure 3 illustrates a markedly advanced neuro-retinitis albuminurica and shows the eye ground of a patient with chronic nephritis two weeks prior to his death. Please note the swelling of the nerve head (there was an elevation of 2 dioptries) and the prominent milky edema of the retina especially noticeable in the region of the papilla. The veins are dark and somewhat tortuous; there are many hemorrhages most of which are linear and striated showing their position to be in the nerve fibre layer. This case has the following history:

Case, F. A., age 53, plasterer, seen Mar. 10, 1920. Illness began 1½ years ago, with cough and heart embarrassment. Vision became impaired 2 weeks ago; could no longer read newspaper print one week ago. Vision: R. eye, counts fingers at 6 feet; L. eye, counts fingers at 5 feet. Albumin and casts present in large quantities. Blood pressure, systolic 220, diastolic 150. Heart enlarged; loud murmur.

Of more value than the recognition of the

outspoken retinal lesions which represent the more or less typical ophthalmoscope pictures of disease, is the ability to recognize the minute changes that occur early in the course of the renal disturbance.

Here we have alterations in the vascular tunics similar to those occurring in arteriosclerosis. There are, indeed, many phenomena common to both diseases, so that in the incipient stages it is usually impossible to differentiate one from the other. Only later in the course do the symptoms of one or the other become predominant. We have, then, in the study of the eye grounds, an important means of detecting these early changes, at a time when treatment is most likely to stay their progress.

Chronic interstitial nephritis is the type most commonly responsible for retinitis albuminurica. Next in frequency is the chronic parenchymatous type. Weeks says that in the former, the retinal changes precede the appearance of albumin and casts, and follow the thickening of the vessel walls. In the latter case, the eye symptoms follow the appearance of albumin and casts, and precede the thickening of the vessel walls.

The amount of albumin in the urine is in no wise a guide to the extent of the retinal changes.

*Changes in the eye grounds due to diabetes.*—The changes here are confined usually, to the posterior pole of the eye, and consist of small white or yellowish roundish spots, especially in the region of the papilla. The spots are sometimes bunched producing various figures, but the stellate figure in the macula is rarely present. The papilla and vessels are seldom affected. Small hemorrhages are often to be seen between the white spots.

The case of retinitis diabetica I am presenting tonight, reveals many of these changes. Numerous small white and yellowish spots are to be seen in the vicinity of the nerve head. Some have coalesced to form larger and more irregular shaped patches. The more recent ones are more brilliant and sharply outlined and whiter; the older ones are yellowish and tend to blend with the surrounding retina. The papilla and blood vessels are normal and

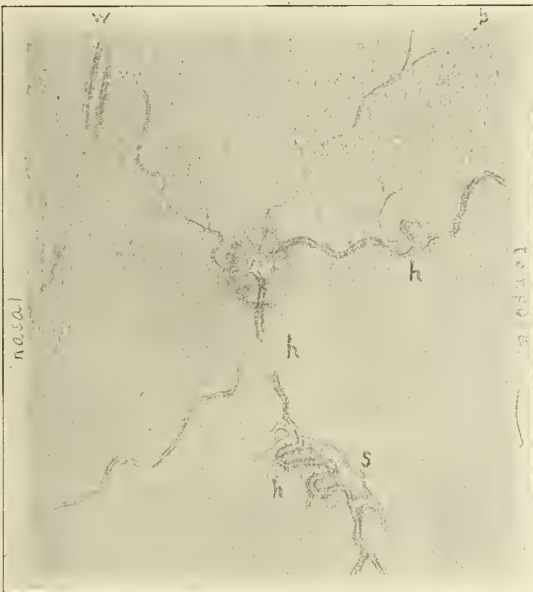


Fig. 2. Old Thrombosis of Central Retinal Vein. Left eye-ground of same patient as Fig. 1, thrombosis having occurred 14 months ago. Note the complete disappearance of many retinal vessels, others (b) are replaced by white lines; the sites (h) of former rupture of veins with massive hemorrhages into the retina; the new anastomosis (s); and the white streak (w) representing connective tissue proliferation, (retinitis proliferans).

there are no hemorrhages. The left retina displays a beautiful arrangement of these spots in the form of a circle with the fovea as its center. This is a rare type, called *retinitis circinata*. We are exceptionally fortunate in being able to present such a case for observation.

These retinal lesions have not the same bad prognostic significance that goes with *retinitis albuminurica*.

*Changes in the eye grounds due to syphilis.*—

A frequent cause of chorio-retinal lesions is syphilis. It is responsible for many of the vascular degenerative changes already referred to under the name "arterio-sclerosis" and in addition excites more characteristic alterations in the choroid and pigment epithelium. This is represented by clumping of black pigment and by white patches. The pigment spots may take various shapes; they may be round, irregular, web-like, and they may form delicate mantles over the smaller retinal vessels, or form black bands around white patches.

Hereditary syphilis is sometimes discovered by finding dense black roundish spots in the most anterior portion of the retina. Atrophy of the choroid and retina in the form of small

or large, round or irregular white patches surrounded by a black ring is caused by syphilis. In these patches the vessels of the choroid may be partially or totally obliterated and in the latter case appear as white bands. If the choroidal pigment has been displaced the sclera may be seen bluish white.

A type of syphilitic chorio-retinitis is displayed by a patient presented this evening. In the periphery of the retina, especially the lower outer quadrant, and in the macular region, densely black spots are visible. The papilla is atrophic and of a dirty yellowish tone. The veins are small and the arteries so narrowed as to be almost invisible. The markings of the choroid are exceptionally distinct because of atrophy of the pigment layer. In the vicinity of the papilla the choroidal vessels reveal evidences of sclerosis. In the left eye there is evidence of an old iritis in the form of posterior synechia. In the presence of these eye ground changes coupled with signs of old iritis I believe the etiology to be lues in spite of the negative blood Wassermann. Further blood and spinal fluid tests will be made.

The changes described above represent the essentially chronic changes of syphilitic chorio-retinitis or the old lesions to be seen after the exudative inflammation has run its course.

Acquired syphilis may be the cause of either diffuse or circumscribed changes. The diffuse type is characterized, during the inflammatory stage, by general cloudiness of the retina with occasional patches of deeper gray. As the inflammatory phenomena disappear, alterations in the pigment epithelium occur, resulting in a migration of pigment into the retina and the formation of irregular figures as in *retinitis pigmentosa*. I am unable to show you this affection at this time but I have managed to bring here a patient with *retinitis pigmentosa* so that you may view, at least, the spider-like figures of pigment.

Papillitis due to syphilis is apt to be marked by pronounced blurring of the outline of the disc and a peripapillary edema of 2 disc diameters.

*Changes in the eye grounds due to tuberculosis.*—Of recent years, through the employment of

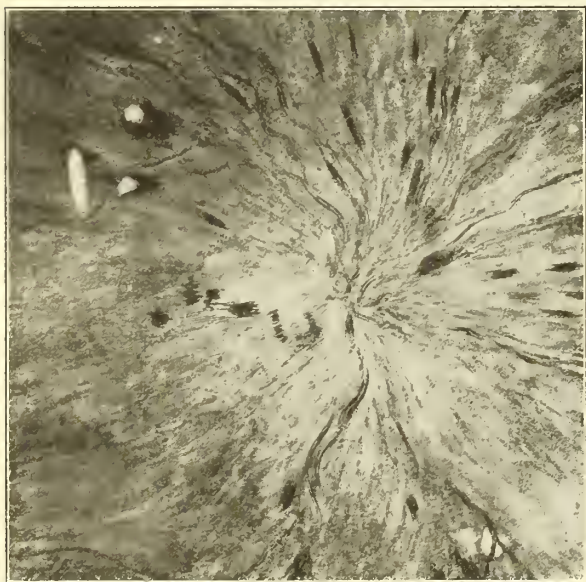


Fig. 3. *Neuro-Retinitis Albuminurica*. Right Ocular fundus reveals a few white spots and numerous striate hemorrhages in the vicinity of the papilla. A papilledema of 2 dioptres elevation is present. Obscuration of the outline of the disk is complete. The edema can be seen to cover the vessels in places as a veil. The veins are thick and tortuous, the arteries slightly narrowed. In places they are entirely lost to view.



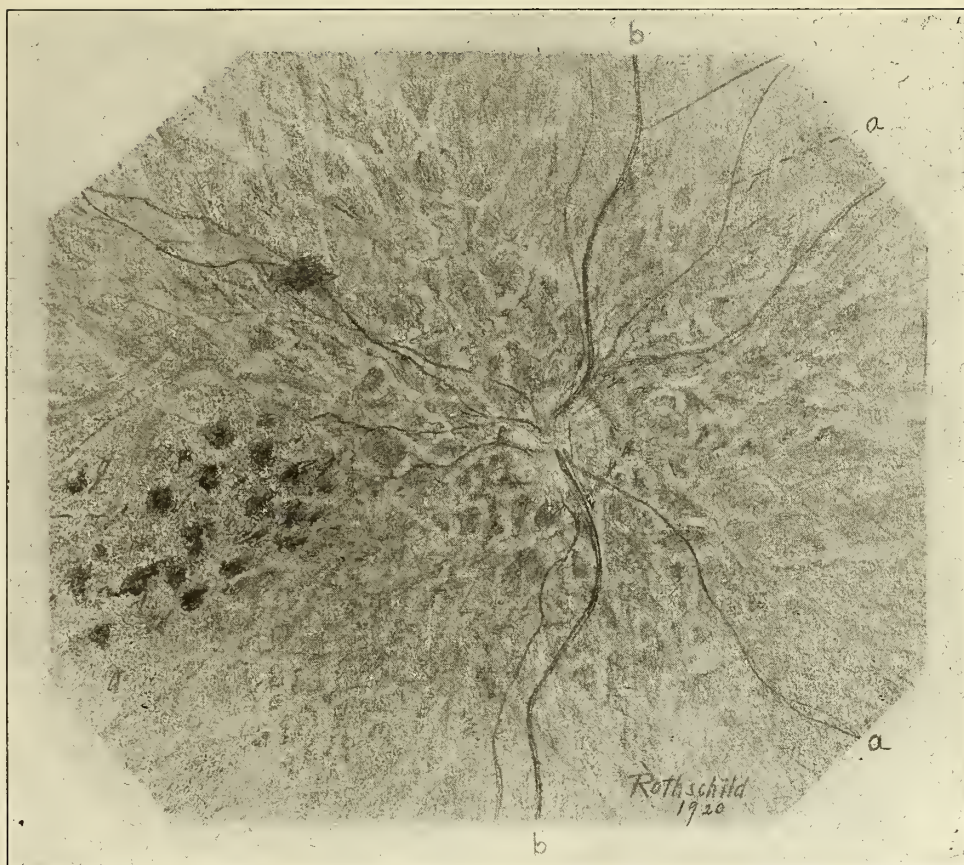


Fig. 4. Chorio-Retinitis Syphilitica. Right eye-ground of male, age 50. Atrophy of pigment epithelium of the retina allows marking of the choroid to stand out sharply. In the vicinity of the papilla the choroidal vessels are sclerosed. There is a post neuritic atrophy of the papilla, and in the region of the macula clumps of densely black pigment are to be seen. Both the arteries (a) and the veins (b) are narrowed, the former extremely so.

tuberculin both as a diagnostic and curative measure many obscure chorio-retinal lesions have been found to be of tuberculous origin. They occupy the posterior portion of the eye-ground while syphilitic lesions occupy, for the most part, the anterior. Recent lesions are seen as raised grayish spots which represent the edematous retina overlying the choroidal tubercles. Old cicatricies are usually of irregular outline, light in color and have more or less pigment within or encircling them. The pigment, however, is rarely as dense or black as in syphilitic lesions and choroidal vessels are never exposed.

Optic neuritis is to be seen in 25 to 30 per cent of cases of tuberculous meningitis. It can not be recognized as of tuberculous origin unless other evidences of the disease are present in the eye.

*Changes in the eye grounds due to certain in-*

*tracranial lesions.*—Little need be said concerning the value of the ophthalmoscopic picture in cases of suspected intracranial lesions. Any disturbance which increases the intracranial pressure is likely to be accompanied by choked disk. Choked disk is present in over 80 per cent of brain tumors. The papilla in these cases is tremendously swollen; it appears to be enlarged and is raised considerably above the level of the retina. The veins are markedly engorged and tortuous and the arteries narrowed. The papillary edema is striated radially and here and there a spot of white exudate or hemorrhage may be seen.

Tumors of the cerebellum or cerebello-pontile angle are most frequently accompanied by choked disk, those of the frontal lobe of the cerebrum and of the hypophysis, least often.

The intracranial conditions most frequently responsible for papilledema in children are

acute and chronic meningitis, hydrocephalus, and tuberculosis.

Papilledema is often the earliest positive sign of brain tumor. It behooves us, therefore, to examine the eye grounds in every case where the patient complains of persistent headache.

#### CONCLUSIONS

In closing, let me say that the ophthalmoscopic picture is frequently the first sign that points the way to a correct diagnosis.

It is of value in prognosis, with reference especially to albuminuric retinitis and to certain types of arteriosclerosis of the retinal vessels.

Finally, no examination of a patient for evidences of systemic disease, and particularly for evidence or extent of generalized vascular degenerative changes, is complete without a study of the eye grounds.

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#### NASAL ACCESSORY SINUS INFECTION\*

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*Mankato, Minn.*

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Foci of infection situated in the teeth, tonsils or appendix being quite accessible, are most readily detected and removed. Foci in the paranasal cells are many times overlooked and their part in producing general systemic disturbances such as headaches, neuralgias, neuroses or eye disorders, may be lost sight of.

Anatomically the paired sinuses frequently lack symmetry, and on transillumination a dark sinus may be due merely to lack of development. A really typical sinus formation has been the exception rather than the rule in patients presenting themselves for examination. Because the paranasal cells are anatomically irregular and topographically concealed, the difficulty of diagnosis and treatment arises. Several anatomical and physiological conditions must be considered in studying these infections.

Normally, self drainage is established through the action of the ciliated epithelial lining which carries secretions through the normal ostia; intranasal obstruction, like deflection of the sep-

tum, hypertrophy of the turbinates and nasal mucosa, or neoplasms and polyps, interfere with drainage. The frontal sinus is the only one which has constant gravity drainage when the body is erect, the ethmoids only occasionally, while the maxillary and sphenoid sinuses are located so that they have gravity drainage only when in certain recumbent positions.

Because of the nasal passages being subject to frequent inflammatory attacks and the close relationship between the mucous membrane and periostium, structural changes in bone and soft parts result. This matter is one of great importance because it bears upon one of the most important phases of treatment, namely, drainage. Sluder, White, Smith and others have called attention to the action of osteoblasts under pathological stimulation; in some cases, bone salts are precipitated causing hyperplasia, while, in others, bone salts are absorbed and an atrophic condition results. Both conditions may be present in the same case and account for the distortions in the nasal cavity which one frequently sees. Sinusitis is due to bacterial invasion. Toerne demonstrated that the mucous secretion has a marked inhibitory action on anthrax bacilli even though it does not possess any special bacteriocidal power.

In an infection of the sinus, therefore, both the ciliary action and the inhibitory property of the secretion to the growth of bacteria must be overcome. Lowered vitality of membranes and direct bacterial invasion are combined causative factors, but Killian has shown that infection will also develop through the blood and lymph channels. Pus under tension and away from oxygen is more virulent than that exposed to air.

The bacterial causes most frequently encountered are: the influenza bacilli, pneumococci, staphylococci, streptococci, colon bacilli and diphtheroid bacilli. Recently the most frequent infections can be laid to influenza.

The invading bacillus causes inflammation and swelling; lymph and leucocytes are thrown off and there is pus formation. If the ciliary action of epithelium is not sufficient and the ostium is closed by swelling in its lumen or by nasal swelling and obstruction, stagnation, retention and mixed infection with permanent changes in the mucous lining are the result. Such changes may

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\*Presented before Southern Minnesota Medical Association, Winona, Minn., June, 1921.



assume the form of granulomata, polypoids or fibromata.

Skilern draws the following conclusions:

1. Pathogenic micro-organisms are never present in normal sinuses, the mucous membrane being able, under ordinary conditions, to render inert and expell the germs.
2. The primary or infective germ may disappear, allowing germs of secondary infections to continue the disease.
3. Pure cultures of one variety are seldom found in suppurative sinus infection.
4. The most common organisms found are staphylococci and streptococci, but four or five separate micro-organisms may be found in the same culture and it is impossible to state which was the primary infector.
5. In continued cases the type of organism may change and recurrences be of different bacterial origin.

Several distinct methods of infection may occur:

1. Direct infection by pathogenic bacteria.
2. Extension of inflammation and infection from neighboring parts (abscessed teeth).
3. As result of tuberculosis, syphilis, malignancy or latent empyema.
4. Through blood and lymph channels.
5. Through traumatism and exposure.
6. Through foreign bodies. (Dental drill or unerupted tooth).
7. Through extension from other sinuses.

When there has been a destruction of the mucous membrane in these cavities it is not likely to be entirely regenerated, as the blood and lymph supply is not profuse. These infections are usually walled-in processes and produce local symptoms such as neuralgia; they are not as likely to show general systemic signs as do tonsils and abscessed teeth, unless necrosis has set in and the physiological wall has been broken down. The sphenoidal and ethmoidal sinuses, deriving their blood supply largely from the mucosa, are more subject to necrosis of the bone than are the antrum and frontal sinuses. For that reason they cause more constitutional phenomena. One half of the wall of the orbit adjoins sinuses and many eye conditions are associated with sinusitis. Recurrent iritis, iridocyclitis,

oculomotor paralysis, ophthalmitis and orbital cellulitis are the most common.

Unless relieved early before structural changes have occurred and when there is still a possibility of regeneration of the mucous tissues, purulent sinusitis or empyema cannot be considered cured even after radical surgical measures. The best that can be claimed is that the disease is arrested. A sinus, even after radical operation, is more liable to reinfection than a normal sinus is to an original infection.

Complications of sinusitis are common, due to anatomical relationship. The veins of the frontal sinus anastomose with the large longitudinal sinus; ethmoidal veins empty into the superior and inferior ophthalmic veins and anastomose with the veins of the dura; sphenoidal veins anastomose with the cavernous sinus. Besides, defects in sinus walls are not uncommon.

To establish a diagnosis it is necessary to take into consideration the clinical symptoms, besides using transillumination and x-ray. A general malaise or the rheumatoid aches and pains usually attributed to dental and tonsillar infections may be the only symptoms. We must not overlook a sinus focus in nephritis, gastric ulcer, in various eye infections, migraine, neuralgias and neuroses, even though there are no local sinus symptoms present. In luetic patients symptoms laid to the disease itself may have their seat in an infected sinus. Transillumination is useful only in marked antrum and frontal sinus involvement and is useless in ethmoid and sphenoid cases. X-rays should be taken in all cases and even then expert interpretation of plates is necessary.

Mere nasal inspection is usually useless on account of the swelling of the mucosa and the tissues must be shrunk and suction used in order to determine the origin of the pus. Treatment of sinus infections therefore depends on many conditions. Some cases may be treated expectantly while others demand prompt and radical procedures. Much depends upon whether the case is acute or chronic. The engorged mucosa is shrunk with adrenalin and cocaine (10-20 per cent) and the origin of the pus and secretions noted. If none shows apply suction and inspect again.

In acute cases two things must first be done: the patient must be kept comfortable and the inflammation allayed. After using cocaine and adrenalin locally, copious hot saline irrigations relieve some cases. Inhalation of Menthol drops 1, Comp. Tr. Benzoin ounces 4, one half ounce in one pint of water is useful, as is heat with electric light bulb, and sweating. Direct irrigation is contra-indicated in acute cases. If heat does not relieve, cold sometimes will.

In chronic sinus disease the end in view is to establish drainage and to regenerate the sinus mucosa. To enlarge the sinus ostia by relieving intranasal obstruction from polypi, turgescence and hypertrophic tissue or deviated septum is the first surgical measure to be adopted in any case. When a series of cells are affected, like the maxillary antrum with the ethmoids, drainage of the antrum alone frequently clears up the ethmoid involvement. An intranasal operation on the antrum (like Dahmer's), is usually sufficient. Skillern describes a pre-turbinal operation which permits inspection of the cavity with an ear speculum, but the opening closes up quickly and drainage is not permanent. A combination of this and a method used by Dr. Faulkner of the Manhattan Hospital gives permanent drainage. The mucous membrane and periosteum is elevated to the floor of nose and after the bony partition has been removed and the antrum curetted the flap is laid onto the floor of the antrum. Caldwell-Lues or Denkers operation are required when there is much granulation tissue. For frontal empyema I prefer Lathrop's operation to Killians'. In the former the septal partition from sinus to nose is removed and little disfigurement results.

#### DISCUSSION

DR. H. I. LILLIE, Rochester: Accessory sinus disease has always been an interesting subject because the last word has not been said. Personally, in any questionable case, I would not care to make the statement of involvement of the sinuses without the privilege of examining the case several times. The clinical findings, the history, and roentgenograms are features to be considered. The variations as shown in the slides must be recognized in attempting to make a diagnosis. A previous sinus involvement so thickens the periosteum and sometimes the bone as to form shadows in the roentgenogram. This must be considered. Schleich has gone so far as to say that in certain cases he should not render an opinion without the privilege of having seen the case,

sometimes as long as three weeks. In accessory sinus disease there is no question but what frequently the cause is some focus of infection. The search for foci must not be left to the ear, nose and throat man. Too often in our enthusiasm of focal infection, if the teeth, tonsils, and accessory sinuses are negative sufficient search is not made thereafter.

The treatment of accessory sinus disease in the early stage is important. As brought out by Dr. Schlesselman, very little should be done in a surgical way because there is considerable danger attending operation. Recently one man stated in a Copenhagen medical journal that puncture of the antrum was not unattended with danger. It may produce a spasm with a secondary effect on the phrenic and vagus nerves. I proved this by closing off the trachea in a Belgian hare, and found the intratracheal pressure was very much increased over the normal following the injection or manipulation within the antrum. So it is apparently reflex. Surgical procedures in cases of acute infection of the antrum may spread infection and drive the blood supply towards the cribriform, resulting in meningitis. It is far better, unless there are severe symptoms, to let the acute antrum resolve under local measures, as outlined by the essayist.

In the management of chronic sinusitis, I am in accord with Coakley and Eggleston and other experts that certain cases require drainage, and certain other cases require operation. The drainage can usually be readily carried out intranasally. In the very severe cases that present themselves, nothing short of radical operation seems to accomplish any results, and I think the tendency in these severe cases is to err more on the side of conservatism than on the side of radical operation. The ultimate results, as far as relief of symptoms is concerned, can be accomplished satisfactorily in the majority of such accessory sinus cases. The results cannot be had in one or two weeks. It is only fair to tell these patients how long it is necessary for them to be under observation, but there is certainly a good chance for them to be relieved. It is the consensus of opinion of many men doing ear, nose and throat work that we are on the threshold of knowing something about accessory sinus disease.

DR. HORACE NEWHART, Minneapolis: I wish to heartily concur in what has been said by Dr. Schlesselman and Dr. Lillie as regards the difficulties of diagnosis of sinus disease in general, and I would like to call attention to some recent experience of the difficulties in recognizing these cases of dental origin. Here the x-ray is not frequently definite, and we have had several surprises on opening the sinuses in the performance of the radical operation. This I think is justified in some of these cases which are indefinite, and particularly where the patient is suffering from the remote effects of focal infection which has not been recognized. Along this line, although I may be premature in expressing myself, I would like to



call the attention of those present who are doing eye, ear and nose and throat work, also the general practitioner to the not infrequent remote effects of sinus involvement upon the eighth nerve. Being particularly interested in otology, we make a routine examination to determine the functional acuity of the hearing both before and after sinus cases. In quite a number of instances we find that without other treatment people who complain of tinnitus or other ear symptoms show marked amelioration after the sinus difficulty has been cleared up. This is suggestive, but I think those of you who follow the work as regards the more frequent examination of the ear and testing it for functional acuity, will be able to confirm my statement.

DR. C. A. LESTER, Winona: From the standpoint of one who does eye, ear, nose and throat work, we will occasionally have people referred to us with the statement, "Please examine the eyes, doctor. He had headaches." An eye headache generally comes on either spontaneously at any time from chronic eye strain or after the use of the eyes for close work. Patients come in any say, "I have a headache every day. I have it when I get up in the morning, and after I am up and stir around my headache is bad, but after a few hours it gets better." I tell these patients that their headaches are probably not brought on by the eyes alone, and possibly not at all, but are more probably due to nasal trouble than to ocular trouble. Such headaches are frequently due to focal infection or to involvement of the nasal accessory sinuses.

## COMPARATIVE VALUES OF THE ANTI-SYPHILITIC DRUGS\*

H. E. MICHELSON, M. D.,  
Minneapolis, Minn.

The arsphenamines are established as drugs of choice—in fact one might say of first choice—in the therapeutic regime against syphilis. As chemo-therapy has advanced, various arsphenamines have been elaborated with a resulting confusion. From a purely clinical experience it is most difficult to assign to each member of this group its relative position. Since salvarsan and neo-salvarsan are so well known, I shall only mention them.

*Arsphenamine* (salvarsan) may be looked upon as the mother salt. Its therapeutic efficiency is well known. There is no question that arsphenamine has a marked effect upon the visible lesions of syphilis and that it is well

tolerated and produces no marked clinical sequelae in the majority of instances. Recent studies show that therapeutic doses do produce microscopic lesions in the kidney, liver and brain, which, however, as I have said, in the majority of instances are negligible, clinically.

The greatest objection to arsphenamine has been the rather troublesome mode of neutralization and the dilute solution required.

The next drug of the series which has been extensively used, is neo-arsphenamine. Neo-arsphenamine is not arsphenamine in convenient form. It was produced as a salt which was ready for use on solution without neutralization and could be used in concentrated solution, thus making intravenous injection with a small syringe possible. Its toxicity is lower, while its therapeutic effect is at least almost on a par with arsphenamine. The immediate reactions are probably a trifle more frequent and remote accidents such as dermatitis and icterus occur with approximately the same frequency as with old salvarsan.

*Sodium arsphenamine* is the disodium salt of arsphenamine and was produced in order to offer the physical and therapeutic features of arsphenamine in convenient form. No claim for superiority for this drug has been made, the advantage lying in its physical properties. It, however, chemically differs decidedly from alkalized arsphenamine.

We have recently completed a careful study of 545 injections of sodium arsphenamine on 66 patients with active lesions of syphilis. From this experience and review of the literature, we concluded;—

That sodium arsphenamine is a readily soluble, easily administered, safe and efficient preparation. We employed a rather small dosage. Three tenths of a gram of the drug produced marked effect upon active visible lesions in males of approximately 150 pounds. From our observations, we believe that 0.45 is a safe and efficient average dose and although we employed as high as 0.6 Gm., this size was not found to be as well tolerated as the smaller doses. The solvent was sterile distilled water using from 10 to 20 c. c. for each dose. We encountered no reactions which we attributed to the concentrated solution.

\*Presented before the Southern Minnesota Medical Association, Winona, Minn., June 1921.

Sodium arsphenamine was administered in short intense courses 0.3 to 0.6 Gm. daily for three doses. Average doses 0.45 Gm. were administered at a five day interval for six doses and rather large doses (0.6 Gm.) were injected at a weekly interval for eight doses, according to the exigencies of the case. In no instance did we note untoward results which we thought were due to the interval.

Sodium arsphenamine exerts a marked influence upon the clinical manifestations of lues. This effect is not as rapid as that observed when arsphenamine or neo-arsphenamine are employed, the dosage employed being equivalent.

We most emphatically believe that sodium arsphenamine courses should be supplemented with mercurialization. In a few cases we employed sodium arsphenamine alone and allowed a long period of rest. Relapses both clinical and serological were noted.

Sodium arsphenamine exerted about the same effect upon the Wassermann as the other arsphenamines.

*Silver arsphenamine* was suggested by Ehrlich and elaborated by Kolle, who experimented with combinations of the various heavy metals and the salvarsan molecule. He gives the following table which shows that silver salvarsan has a more profound effect on experimental syphilis than any of the other members of the salvarsan group.

|               | Dose         | Spirochetes    |          |  |
|---------------|--------------|----------------|----------|--|
|               |              | Disappeared in |          |  |
| Old Salvarsan | 0.01 Gm. per | Kilo           | 72 hours |  |
| Neo " "       | 0.015 " "    | " "            | 48 "     |  |
| Copper " "    | 0.004 " "    | " "            | 96 "     |  |
| Gold " "      | 0.005 " "    | " "            | 48 "     |  |
| Platinum " "  | 0.005 " "    | " "            | 48 "     |  |
| Silver " "    | 0.004 " "    | " "            | 24 "     |  |

Kolle concluded from his work that silver when combined with the salvarsan molecule forms a combination which has a greater spirochetocidal action than any other combination with which he worked. He thinks that silver salvarsan acts upon the syphilitic process in a two-fold manner, the salvarsan molecule exerting its well-known spirochetocidal effect, while the presence of the silver radical seems to inhibit the growth of spirochetes by stimu-

lating the defense mechanism of the body cells. Therefore, he thinks silver salvarsan acts in combination.

After a careful survey of the literature and after the use of 250 ampules, we feel that we may safely state that silver arsphenamine is an efficient spirocheticide which has a pronounced effect upon the visible lesions of syphilis.

Silver arsphenamine is a dark brown salt. It is readily soluble in sterile distilled water but its color makes it impossible for undissolved particles to be seen. It is, therefore, safer to filter the solution before use.

The therapeutic dose is one-third that of arsphenamine. Most observers believe that the initial dose should be small, 0.05 Gm. to 0.1 Gm. and that 0.2 Gm. to 0.25 Gm. is the best average dose. The drug may be administered at short intervals (3-5 days) or one may lengthen the interval to a week and administer 12 to 15 doses. Prolonged courses have been employed in neuro-syphilis, accumulative effect rarely having been noted.

Immediate reactions are seldom encountered, while few cases of retarded reaction (dermatitis, icterus, etc.) have been reported. No authentic case of agyria has been observed. The effect on the Wassermann is on a par with the action of the other arsphenamines on this phenomenon.

One decided advantage of silver arsphenamine over the other members is the fact that the patient does not sense the characteristic garlic or other odor which is so disagreeably present during administration of the other arsphenamines.

#### COMMENTS

As yet no conclusive work has been done which accords superiority to any member of this group of drugs.

In attempting to classify the various drugs, one must consider first, which drug has the most profound effect on the visible lesions of syphilis and can be given with the least danger to the patient.

In our own experience, arsphenamine and neo-arsphenamine have about the same action on lesions which may be compared, occurring in individuals of about the same general constitutional characteristics. We believe that



retrogression has been slower with sodium arsphenamine and silver arsphenamine. We are certain that mucous membrane lesions have been quite resistant to silver arsphenamine. However, the number of cases observed under sodium arsphenamine and silver arsphenamine is much smaller so that one might be inclined to compare the outstanding good results with the older drugs, with the poor results of the newer ones.

The painstaking pathological studies made on animal subjects receiving arsphenamine and neo arsphenamine conclusively show neo arsphenamine to be the less toxic.

Silver arsphenamine has been given in long continued courses and has probably been better tolerated when so employed than when the other members of the group were used over a long time. This very likely is due to the much smaller therapeutic dose.

The effect of all of the anti-luetic remedies in their action on the Wassermann reaction is variable. The personal factor must be considered, and since the same individual cannot receive two drugs under precisely the same circumstances (age of infection, etc.) it is utterly impossible to make an accurate comparison.

Nothing conclusive has been published to show that any member of this group of drugs possesses a selective action on any particular type of syphilis (cutaneous, osseous, neuro, etc.).

We believe that in all arsphenamine courses the patient must be carefully watched and questioned for early warning symptoms on the part of the organism against further amino-arsenicals and that the slightest significant symptom should cause the operator to delay subsequent injections in order to avoid grave accidents such as dermatitis, icterus, etc.

Until more evidence is at hand we most emphatically urge that mercury be used in connection with courses of any of the arsphenamines.

In conclusion we must warn against over enthusiasm for any particular drug or regime of treatment. Future therapy may be along the lines of organic therapy in preference to the use of heavy metals.

## THE CHILD'S PLACE IN THE TUBERCULOSIS CAMPAIGN\*

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As we look back over the campaign conducted against tuberculosis we have to admit that the results have not been what was at first anticipated. Much has been accomplished but the better the disease is understood the more we realize that there is much to be done before a great reduction in the death rate can be expected. At first it was thought that if institutions could be built to care for the clinical cases of tuberculosis developing in the adult the time would soon come when it would be eradicated. Those needing treatment or the difficulty in discovering them was not realized. The time required to bring an active case to a stage of arrest was greater than was at first anticipated. Many more beds and institutions were needed than could possibly be provided and it was early recognized that many, in fact the bulk of the clinical cases would have to be treated in the home. Our efforts have been mainly directed toward taking care of the clinical case and very little attention has been given to those he may have infected unless they also became actively diseased. In other words the child though infected has had little consideration. Time and money have been spent in an effort to cure the disease and its prevention has been largely neglected.

Our best authorities tell us that from 70 to 90 per cent of the human race is infected with the germs of tuberculosis before they reach the age of fifteen years and that practically every one before adult life. If this is true and there is abundant evidence to prove it, infection is much more common than clinical tuberculosis since only about 10 per cent develop it in a clinical form. It is this 10 per cent which offers the problem and needs to be cared for before the disease becomes active.

There are many things about tuberculosis we do not understand. Probably the most important of these is a knowledge of what protects those 90 per cent who do not develop clinical

\*Presented before the Southern Minnesota Medical Association, Winona, June 1921.

tuberculosis although they are infected. If we knew this the tuberculosis problem might be easily solved. You may reply that the resistance in one against the disease is better than in the other. That is true, but what is this resistance? Is it brought about by immunity as a result of a previous infection or is it due to something unknown with which one individual is fortunate enough to be endowed while the other is not. These are important questions and ones we hope will be settled in the near future. If it were possible to establish definitely why one individual does not develop clinical disease and why the other does we could probably develop in the individual lacking protection what is needed to carry him safely through life without becoming actively diseased with tuberculosis. No doubt immunity either as a result of an earlier infection or inheritance plays a greater part in the prevention of clinical disease than has been previously acknowledged. Tuberculosis developing in a family when others have recovered or had the disease in a very chronic form usually offers a favorable prognosis while that developing in families with a negative history or when the resistance is poor usually offers a very unfavorable prognosis. Some families are protected or at least show more resistance than others. Weakness or resistance then appears to be more a family trait than that of the individual. It is evident that infection plays some part in protecting an individual by establishing at least a partial immunity. This has been recognized for some time by students of tuberculosis and efforts have been made to establish an artificial immunity but without uniform success. Work in this field offers opportunities but it is doubtful if it will be possible to establish a complete immunity.

Time of life when one becomes infected and amount of infection is also to be considered. The younger the child the greater will be the chance of the disease becoming active following infection. While the child may overcome a certain amount of infection and hold it in check a greater amount may overcome the resistance. He is fortunate who receives his infection in doses small enough to be able to control it for he is laying in store for himself a certain amount of immunity which may protect him later in life.

The optimist may say "prevent infection and you will prevent tuberculosis." Certainly if there were no infection there would be no tuberculosis. Theoretically this is true but if there were no infection there would be no immunity such as is possessed by one previously infected. If we could be sure of destroying all chance of infection we would be insured against tuberculosis. On the other hand there is no doubt but that the individual who carries a previous infection or an inherited immunity as a result of the disease in one of his ancestors has a better resistance than he who does not. This has been very clearly demonstrated by the resistance shown in the Hebrew race and the lack of resistance in the Indian and Negro when exposed to infection. The fact that one has been infected is not so serious as might be supposed. It may be an asset rather than a liability. •

The chance of escaping infection is almost impossible but infection alone will not cause clinical tuberculosis. When clinical disease develops there are present both infection and a lowered resistance, neither of which alone can cause the disease. It is evident then that our best means of preventing the disease is to prevent infection and build up a resistance. The former is practically impossible as is shown by the number infected before reaching adult life. Time of life and amount of infection taken into the body at one time may be largely controlled. Every means possible should be exerted to prevent infection during the first year of life for the danger then is greater than later. During this period the child is protected to a certain extent for he remains where he is placed and if infected it is because infection is either brought to him or he is taken to it. While it is natural for the proud mother to want to display her baby it would be better if it were denied visitors and the privilege of visiting. This would limit its exposure to unknown cases of tuberculosis and spare the danger of infection. The baby should not be kissed by friends or relatives; certainly he does not appreciate it, and the risk is too great. After the first year the child gets more or less beyond control and will probably come in contact with infection since he moves from place to place, often going where he should not and placing all kinds of things in his mouth. The



danger of infection becomes greater as the child grows older but fortunately his resistance also increases.

Regarding the amount of infection, every effort possible should be made to limit it so that it will not overcome the resistance. The child, regardless of age, should not be permitted to live in intimate contact with an open case of tuberculosis. When there is an active case of tuberculosis and a child in the same house either one or the other should be removed, for it is practically impossible for an open case and a child to reside within the same walls without the latter becoming infected. Just what part milk plays in the infection of the child has not been definitely established. Until it has been proven that the bovine bacilli undergo a transition from the bovine to the human form after being taken into the body it can not be given credit for playing an important part in the causation of pulmonary tuberculosis. As a medium for transferring human bacilli from one individual to another it may be of more importance and for this reason no tuberculous person should handle milk.

The resistance and general strength of the child should be carefully looked after. Physical defects should be corrected, proper living conditions provided, acute diseases avoided as far as possible and when they do occur the child should be closely watched until he has entirely recovered. Home conditions should be looked into, and recommendations should include plenty of rest, regular hours and abundance of nourishing food taken at regular intervals. Every possible chance should be given the child to grow up strong and free from physical defects. When thus protected he will be able to hold infection in check and avoid disease.

A child exposed at any time to an open case of tuberculosis should be given special care for he is unquestionably infected. They should be kept under observation and made to live under the best conditions, preferably in a preventorium, when these can not be obtained otherwise.

They should be trained in open air schools with hours of work limited to their strength. When given a chance most of them will grow up strong physically and mentally.

Special attention should be given to the child which is under par physically, in order that he may overcome his physical handicap. It is remarkable to see what improvement these children make when living under the proper conditions observing regular hours and getting sufficient and nourishing food. While these children are not suited for regular school work they do well when placed in an open air school with work adjusted to their strength. Many of them when working under these conditions show marked improvement and even though the hours of work may be limited to half that done in the regular school room the progress in the classes will be as rapid. He grows up healthy while being educated. The question may be asked why would it not be well to educate all children under these conditions. If they would continue to live under them after their education was completed it would be practical but since the majority would not, the results in the end would be better to educate the child under the conditions under which he will live. Those having been exposed to tuberculosis or who seemed predisposed by being under par physically, should continue to live a regulated life under ideal conditions to prevent a breakdown.

"If childhood is the time when infection takes place, it is the time when the one infected should be treated. If some one saw a lighted match lying in a pile of dry and inflammable material he would not stand idly by and say, 'let's see if it will ignite the building,' but would extinguish it at once. We are standing idly by the ignited match in the infected child waiting for the flame to start. Let us take care of the lighted match (infection) and not wait for the flame to develop in the form of active disease and when we do the death rate from tuberculosis will be lowered."

The child should occupy first place in the campaign against tuberculosis.

## THE INVOLVEMENT OF THE LYMPH GLANDS IN CARCINOMA OF THE LARGE INTESTINE\*

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Carcinoma occurs more frequently in the large intestine, with the exception of the stomach and possibly of the rectum, than in any other part of the alimentary tract. DeBovis states that carcinoma of the large intestine occurs on an average of once in every 300 deaths. His percentages for carcinoma of the small intestine are 6.3, of the large intestine 44.5, and of the rectum 49.2.

Statistics collected by Brill show that of 3563 cases of carcinoma, only eighty-nine (2.5 per cent) were of the small intestine. Nothnagel found at necropsy in the Vienna General Hospital, that of 2125 patients who had died of carcinoma 243 had had carcinoma of the intestine. He also records that in 343 necropsies in cases of carcinoma of the intestine from the Pathological Institute of the General Hospital in Vienna, seventeen, less than 5 per cent, were of the small intestine; the remainder were of the large intestine. Hemmeter reports that of 5792 cases of carcinoma collected by various observers, 1296 were of the intestine. W. J. Mayo states that of 1264 cases of carcinoma of the gastrointestinal tract in which operation was performed at the Mayo Clinic, between October 1, 1897, and November 1, 1911, 863 involved the stomach, fourteen the small intestine, 219 the large intestine, and 168 the rectum<sup>20</sup>.

Nothnagel states that carcinoma of the large intestine is most common between the ages of 40 and 60. Most observers agree to this, but state that it may occur at any age and that it is quite common between the ages of 20 and 30. In sixty-six cases collected by DeBovis the average age was 42. The average age in most series seems to be considerably higher than this. Zuppingier cites a case of carcinoma in the sigmoid of a girl aged 12. Clar reported a medullary carcinoma in the colon of a boy of 3.

The disease seems to be slightly more prevalent in males than in females. Clogg reports fifty-five cases, twenty-nine in males and twenty-six in females. In DeBovis' series 53.9 per cent were males and 64.1 per cent were females. In Cumstom and Vander Veer's series 63.83 per cent were males and 36.17 per cent were females. Nothnagel believes, from his own experience, that there is little difference in relative frequency with which carcinoma occurs in the two sexes, but from the statistics he has collected from other observers it would seem that it is somewhat more common in males.

Statistics vary considerably with regard to the relative frequency of carcinoma in the different parts of the large intestine, but most observers are agreed that the sigmoid flexure of the large intestine proper is the most common site. Maydl reported forty-six cases of carcinoma of the large intestine from the Vienna General Hospital; thirteen of these were in the sigmoid flexure, six in the ascending colon, one in the appendix, and seventeen in the remainder of the colon. Nothnagel reports 118 cases also from the Vienna General Hospital; one of these was in the appendix, fourteen in the cecum, sixty-three in the colon in general, and forty in the sigmoid flexure. Bryant reports 104 cases; seven in the cecum, seventy-eight in the sigmoid, and nineteen in the remainder of the colon. Leichtenstern reports 109 cases; forty-two in the sigmoid, eleven in the descending colon, thirty in the transverse colon, six in the ascending colon, and twenty in the cecum.

Carcinoma of the large intestine begins in the crypts or glands of Lieberkuhn. Nothnagel states that the degeneration of glandular epithelium characteristic of carcinoma always begins at the fundus of the glands. The epithelium of the degenerated mucous glands then perforates the muscularis mucosa and the deeper tissues of the intestinal wall. According to Cole, when the carcinoma cells reach the intermuscular network of lymphatics they tend to progress around the bowel in the direction of these vessels, thus accounting for the frequency of the annular or ring carcinoma in the large intestine. The involvement of the lymph glands may take place as soon as the process reaches the lymphatic network of the submucosa, or it may take place

\*Abridgment of thesis submitted to the Faculty of the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree of Master of Science in Surgery, 1921.



through the intermuscular lymphatic net work.

The ordinary form of adenocarcinoma is perhaps found in every carcinoma that originates in the large intestine, but undoubtedly colloid carcinoma has a distinct entity and is present in a great many cases of carcinoma of the large intestine. The histogenesis of colloid carcinoma is still undecided. Hauser states that colloid carcinoma starts from the mucous membrane, but he does not state whether it is a product of local secretion or of degeneration. He believes that colloid carcinoma of the large intestine rarely produces metastasis in the other organs, but chiefly involves the serosa.

Metastasis, as a rule, develops very slowly in carcinoma of the large intestine, Maydl states that secondary metastatic infection of the lymph glands is comparatively so rare as to make the radical cure of carcinoma of the large intestine favorable. Clogg states that carcinoma of the colon in many cases is a local disease. In only six of forty-one cases that he traced to necropsy were there visceral deposits and these were in cases in which the symptoms were of comparatively short duration. The symptoms were noted for from two to six months, and the liver was involved in all cases in which the glands were involved. Symmers in his study of metastasis of tumors in a series of necropsies at Bellevue Hospital, pointed out the striking contrast between the low degree of malignancy, displayed by tumors of the stomach and upper intestinal tract. Of forty-six cases of carcinoma in the stomach, metastasis was found in 82 per cent, in each of three cases in the duodenum, and in only fifteen (46.5 per cent) of twenty-eight in the lower bowel.

Welsh states that carcinoma of the large intestine spreads by direct extension of the cancerous process and by dissemination of the cancer cells. Jamieson and Dobson have shown that the lymphatic drainage of the large intestine follows a certain orderly plan, and Clogg states that the dissemination of cancer of the colon proceeds on the same anatomic lines. Sherrill states that metastasis from carcinoma of the bowel seems to occur most often through blood and that the liver suffers most frequently from secondary deposits. McArthur calls attention to the fact that the portal circulation

alone of all the venous systems seems to transport the infectious elements of cancer, and it is through this means that carcinoma so frequently reaches the liver from the large intestine. W. J. Mayo<sup>21</sup> calls attention to traumatic dissemination of malignant disease, especially during surgical operations. He believes that the infected thrombi in the derivatives of the portal vein are loosened and carried to the liver. Nathaniel calls attention to the fact that metastasis may be present with comparatively small growths and be absent with very large growths. MacCallum cites a case in which the primary mass in the colon was only 3 cm. in diameter, although a metastatic nodule in the liver reached about 22 cm. in diameter.

#### MATERIALS AND METHODS

One hundred preserved specimens, which had been removed operatively in the Mayo Clinic, are the basis of this study. The specimens in the gross, the size, location, form, extent, and character of the growth, and the surrounding normal tissues were first studied. Photographs were then made of the specimens, one showing the growth from the mucosal side and the other showing a cross section through the center of the growth in the longitudinal axis of the bowel. The character and extent of the invasion of the growth into the submucosa, muscular coats, and glands were then studied. Sketches of the specimens were next made, showing the relative location and size of the growth, leaving space on the sketch on which to place the glands, which were to be dissected out, as nearly as possible in their relative positions.

The lymph glands were carefully dissected out. In order to obtain the smallest glands visible to the naked eye, all the gland-bearing tissue was teased out into thin layers, through which the light could be transmitted. In this manner very small glands could be detected. As each gland was removed, its location in the longitudinal and radical directions was recorded, as nearly as possible, on the sketch. In each case the drawing represented the estimated size of the gland. A section of the original growth was taken, and numbered 1, and each gland was numbered in its place at the time it was put in the sketch. The section of the original specimen and each gland was placed in a small phial, cor-

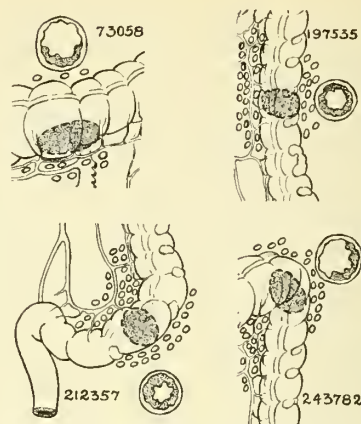
respondingly numbered and preserved in 10 per cent formalin; they were then sectioned, stained, and mounted for microscopic study. Any unusual or especially striking features were recorded on the sketch.

Printed diagrams were obtained of the ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, and sigmoid flexure. A diagram representing a cross section of the bowel was also obtained for each specimen. The longitudinal position of the growth and its position on the circumference of the bowel were sketched. The glands were then sketched on the diagram, as nearly as possible, in the relative position in which they were found. There was no attempt to show the relative size of the glands on these diagrams as was done on the original sketches, but a few drawings were made of typical specimens, in which both the size and location of the glands were represented. On the diagrams, glands without any evidence of carcinomatous involvement were represented in solid black. On the diagram of the cross section the growth was represented as encircling the intestine or as on one or more of its walls.

#### RESULTS

The distribution by decades of the cases studied is shown in Table 1. Forty-two per cent of the patients were in the sixth decade. The average age was 52.31 years; the youngest was 21, and the oldest 76. Fifty-one were males and forty-nine were females.

Fourteen hundred six glands were obtained from the 100 specimens, that is, 14.06 glands for each specimen. In 63 per cent there was no metastasis; in 37 per cent one or more glands were involved. Very few specimens contained more than two or three involved glands, so that it was not considered necessary to make a third group corresponding to that in the series of McCarty and Blackford in their study of the glands of the stomach or that of McVay in his study of the glands of the rectum. All were put into two groups. In Group 1 were cases of carcinoma of the large intestine without metastatic involvement of the regional lymph glands, and in Group 2 cases of carcinoma of the large intestine with metastatic involvement of one or more regional lymph glands.



Figs. 1, 2, 3 and 4. Group 1. Diagrams showing relative position of glands and growths. The circles represent glands not involved.

A study of these two groups suggested Group 3, in which were placed cases of colloid carcinoma of the large intestine. This group was further divided into two sub-groups, cases of colloid carcinoma without metastatic involvement of the regional lymph glands and cases of colloid carcinoma of the large intestine with glands.

*Group 1. Carcinoma without metastatic involvement of regional lymph glands.* Sixty-three patients (63 per cent) were classified in

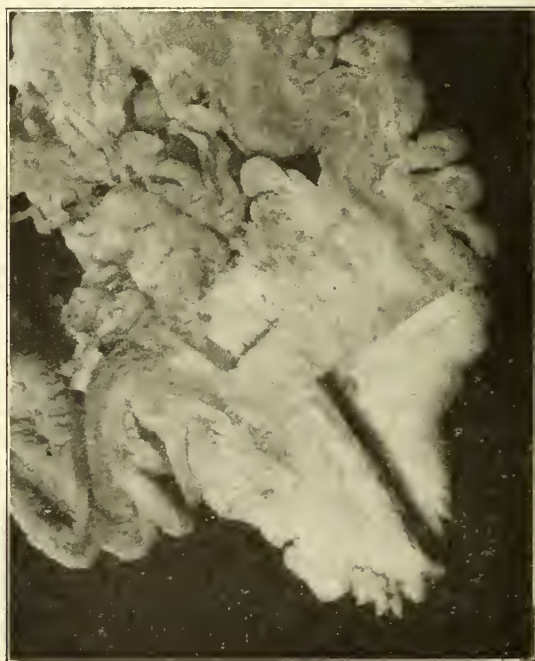


Fig. 5 (Case 184460) Group 1. Growth protruding into the lumen of the intestine, but not extending into the intestinal wall.

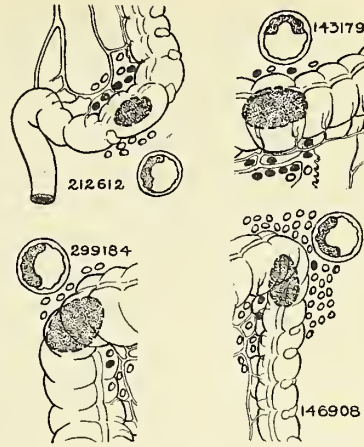


this group; thirty-one of the patients were females and thirty-two were males. The average age was fifty-two and one-tenth years. The average number of glands in each specimen was fifteen and four-tenths. While there were several specimens in which very few or no glands could be found, in the majority there were many large glands. Table 2 shows the sex, age, duration of symptoms, and the number of glands found in each case in this group. Representative diagrams of the glands and growths are shown in Figures 1 to 4. Figure 5 is a representative photograph of a specimen of this group.

McVay pointed out that the size of the malignant growth in the rectum bears no relation to the glandular involvement. Figures 1 to 4 show that the same holds true in carcinoma of the intestine. Nothnagel states that carcinoma usually encircles the lumen of the large bowel and in this manner produces obstruction. The encircling form of carcinoma was present in twelve of the sixty-three cases in this group. Figure 5 shows a marked protuberant growth from one wall of the intestine, which is characteristic of this type of case. Extension seems to be into the lumen of the bowel, rather than into the wall of the bowel. Extension into the muscle and fatty layers is not common.

*Group 2. Carcinoma with metastatic involvement of regional lymph glands.* There were thirty-seven patients (37 per cent) in this group. Nineteen were males and eighteen were females. The average age was fifty-two and twelve hundredths years, and the average duration of symptoms was ten and six-tenths months. The average number of glands in each specimen was sixteen and seventy-five hundredths. The sex, age, duration of symptoms, number of glands found, and the number of glands involved in each specimen are shown in Table 3. Representative diagrams of the glands and growths are shown in Figures 6 to 9. Figure 10 is a photograph of a typical specimen of the group.

As may be seen from the illustrations, the size of the growth bears little or no relation to the amount of glandular involvement. The ulcerative type of growth is more prevalent than the protuberant type which appeared more frequently in the cases in Group 1. In the thirty-seven cases there were nine of the napkin-ring



Figs. 6, 7, 8 and 9. Group 2. Diagrams showing relative position of glands and growths. The black circles represent glands involved.

or annular form of carcinoma. Many others had the appearance of the annular form because of a constricting ring following marked degeneration and resulting scar tissue on one or more sides of the bowel. In the cross section the tendency may be seen for the growth to extend into the muscle and fatty tissue surrounding the wall of the bowel. The carcinoma frequently extended to and involved other organs such as the bladder, ovary, and uterus. The diagrams show also that the gland or glands usually involved are those nearest the point of greatest direct extension of the growth. Occasionally a



Fig. 10 (Case 293388) Group 2. Extensive involvement of the intestinal wall and slight projection into the intestinal lumen by carcinoma.



large gland at this point appeared, macroscopically, to be carcinomatous; on microscopic examination it proved to be inflammatory, while one a little more distant proved to be carcinomatous.

*Group 3A. Colloid carcinoma without metastatic involvement of regional lymph glands.* There were eight patients (8 per cent) in this group. Five were females and three were males. The average age was forty and five-tenths years and the average duration of symptoms was five and six-tenths months. The average number of glands in each specimen was thirteen and two-tenths. The sex, age, duration of symptoms, date of operation, and number of glands found are shown in Table 4.

It has been stated by Hauser and others that colloid carcinoma does not metastasize. A study of this group seems to bear out this conclusion. Two of the six patients in the series of 100 without visible glands are classified in this group of



Fig. 11 (Case 232689). Colloid carcinoma in a lymph gland.

eight, and, clinically most of the patients of this group show very mild malignancy.

*Group 3B. Colloid carcinoma with metastatic involvement of regional lymph glands.* There were eight patients (8 per cent) in this group. The average age was fifty-one and five-tenths years, and the average duration of symp-

toms sixteen and one-tenths months. The average number of glands in each specimen was twelve and five-tenths. The average number of glands involved was four and five-tenths. The sex, age, duration of symptoms, date of recurrence, the number of glands found, and the



Fig. 12 (Case 248261). Extensive carcinomatous involvement of a lymph gland with a marked tendency to cell differentiation.

number of glands involved in each specimen are shown in Table 5.

The patients of Groups 3A., and 3B., are classified in Groups 1 and 2 as well. One thousand four hundred six glands were found in the 100 specimens of the entire series. Only ninety-five showed metastatic involvement; thirty-nine (41 per cent) of which were found in patients in Group 3B. In other words, 41 per cent of the entire number of glands involved were found in 8 per cent of the entire number of patients. In the clinical histories of nineteen of the 100 patients fairly definite evidence was established of recurrence within one and one-half years. Five of the nineteen patients were in Group 3B., thus 26.3 per cent of the total number of recurrences during one and one-half years fall in this group of 8 per cent of the total number of patients.

Case 187084 is an interesting example of



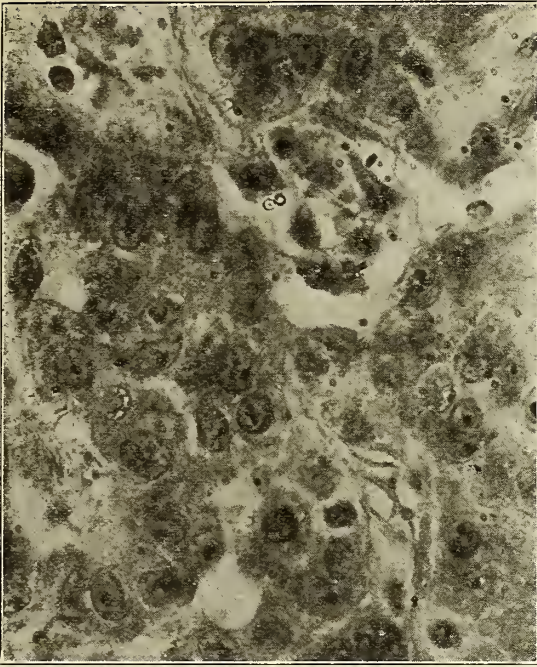


Fig. 13 (Case 143179). Metastasis in a lymph gland with very little tendency to cell differentiation. Large "one-eyed" carcinoma cells; some mitotic figures.

Group 3B. March 8, 1917, the patient had a resection of the stomach for carcinoma of the pylorus. October 13, 1918, she had a resection of the transverse colon for carcinoma. February 25, 1919, she had a recurrence in the abdominal wall, which was resected apparently to the outside of the growth. June 2, 1919, she died, apparently of an extensive carcinomatosis.

Broders has expressed the opinion that once colloid carcinoma has metastasized it is difficult to control. A study of Groups 3A., and 3B., tends to support this opinion. The duration of symptoms is comparatively short in Group 3A., while in Group 3B., it is very long in most cases (Tables 4 and 5.) Figure 11 shows extensive colloid carcinoma in a lymph gland.

Clogg believes that carcinoma of the large intestine is frequently a local disease. MacCarty and Broders have called attention to the fact that if the cells in the carcinomatous metastasis are differentiating, the carcinoma tends to limit itself. Figure 12 shows extensive metastasis in a lymph gland with advanced cell differentiation. The tendency to gland formation is evidence of cell differentiation. A marked contrast to this is shown in Figure 13, in which very lit-

tle cell differentiation but marked destruction of tissue is visible. Under the high power lens the large one-eyed cells, undifferentiated carcinomatous cells, are seen with an occasional mitotic figure. This growth (Case 143179) proved to be highly malignant clinically. The patient was operated on October 10, 1915, for carcinoma of the transverse colon, only six months after the appearance of symptoms. At operation the stomach and ileum were found to be adherent. He died during March 1916, evidently from metastasis; necropsy was not performed. Ten of the fourteen glands found locally showed metastatic involvement, the highest proportion of glands involved shown in any specimen of this series.

Metastasis from carcinoma of the intestine, as has been suggested, may occur in the liver without local metastasis. In one case (Fig. 14) carcinoma was found in the liver, although no involved gland could be found locally. In one other case metastasis occurred in the liver without local metastasis, but in this case a number of large inflammatory glands were found.

Beginning metastasis in a large lymph gland is illustrated in Figure 15. The involvement is first evident near the periphery of the gland through the lymph sinuses. This fact has been

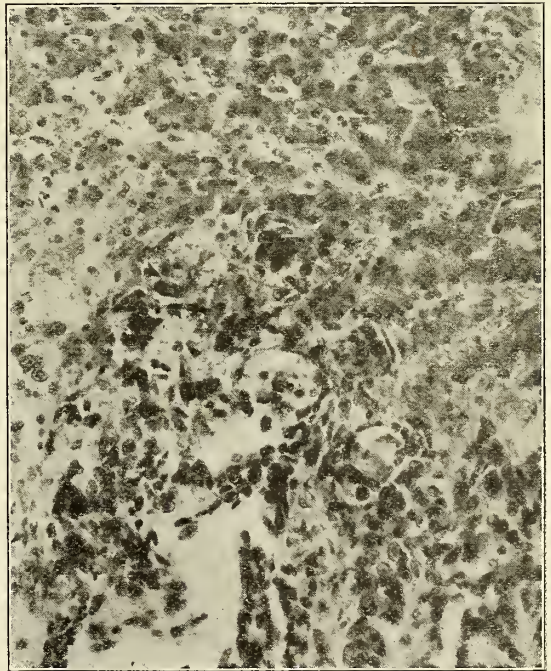


Fig. 14 (Case 248261). Metastasis in the liver.



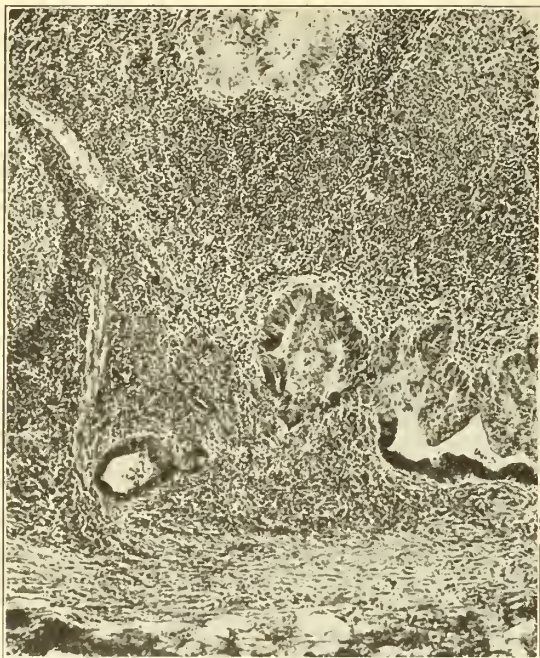


Fig. 15 (Case 187084). Early metastasis in a lymph gland.

pointed out by Billroth, MacCarty and Blackford, Zehnder, and McVay.

The statement has been made often that of growths of the entire alimentary tract, those of the large intestine have the lowest degree of malignancy. A study of this series seems to bear out this conclusion. MacCarty and Blackford found glandular involvement in 52 per cent of 200 cases of carcinoma of the stomach; McVay found 47 per cent in carcinoma of the rectum. In this series metastasis was found in only 37 per cent. The average number of glands involved in this series was also much smaller than in the series of MacCarty and Blackford and of McVay.

In the 100 patients of this series, the sigmoid flexure was involved in forty-two, the descending colon in twenty-one, the splenic flexure in seven, the transverse colon in sixteen, the hepatic flexure in nine, and the ascending colon in five. Diagrams representative of the series are shown in Figures 16, 17, 18 and 19, in order to emphasize the fact that the size or number of glands is not a criterion of metastatic involvement. The intestine is opened on the side opposite the growth, or in cases of annular carcinoma, through the carcinoma. In many cases the gland-bearing tissue posterior to the growth

was cut in the middle and turned out to the sides, so that no glands are represented posterior to the growth itself. The glands are numbered in position as they were removed from the specimen, and in each case the actual size of the gland is represented as nearly as possible. Number 1 represents a section from the growth in each case. The glands posterior to the intestine which were not involved are represented by dotted circles; those which were involved, by circles with cross lines. The glands to the side of the intestine which were not involved are represented as clear circles, those which were involved, as black circles. Many very large glands, it may be noted, show no metastatic involvement, while some very small glands, which might easily escape palpation, show marked involvement. In Figure 16 are shown many large inflammatory glands, without metastasis, which to the naked eye or to the sense of touch seem involved glands. In Figure 17 are shown many glands with metastasis, practically all of which to be practically indistinguishable from the in- are too small to palpate in the abdomen under ordinary conditions. Involved glands were not found at the time of operation, but the growth was extensive, piercing the intestinal wall and involving the bladder and ileum. This case from Group 3B. proved to be one of the most malignant. Figure 19 shows many large inflammatory glands and a very few carcinomatous glands. The size or position of the gland is of very little value in determining whether or not it contains metastasis. Figures 16, 17, 18. and 19 were selected as illustrations without thought of the case number, or the clinical history of the patient, but on investigation of the histories it was found that the two patients with marked metastasis lived but a short time while the other two, when last heard from, were feeling well and had gained 15 to 28 pounds respectively. The unusually large glands with metastatic involvement, illustrated in Figure 18, are a marked exception in this series.

A combined study of the clinical histories and the appearance of the growths suggest the following conditions for which the patients sought medical aid: (1) protuberant growths from one wall of the intestine into the lumen, producing obstruction; (2) the formation of annular car-



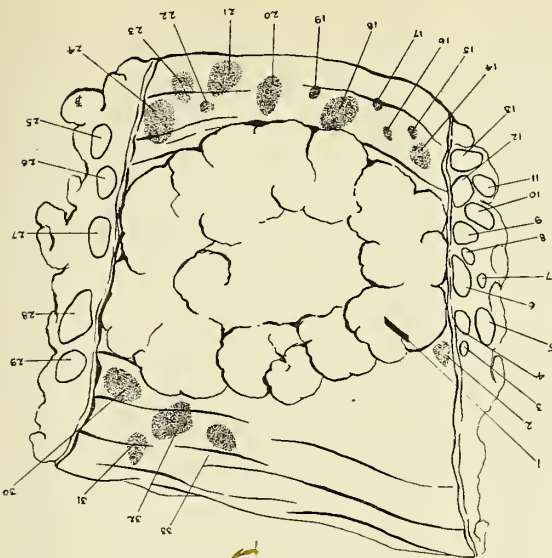


Fig. 16

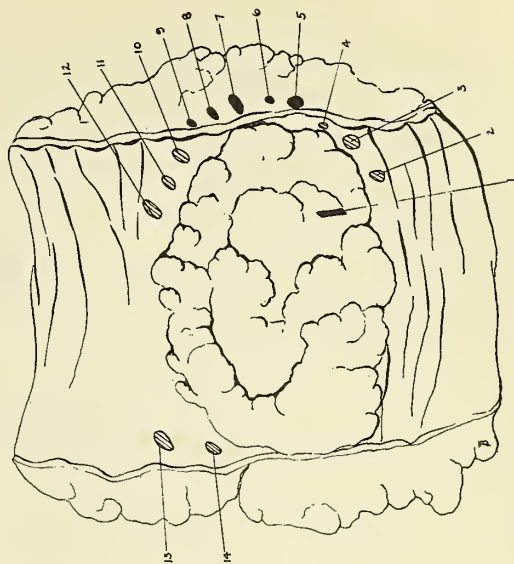


Fig. 17

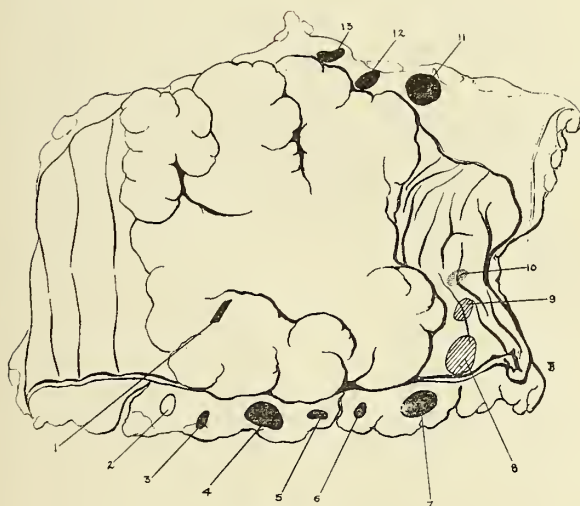


Fig. 18

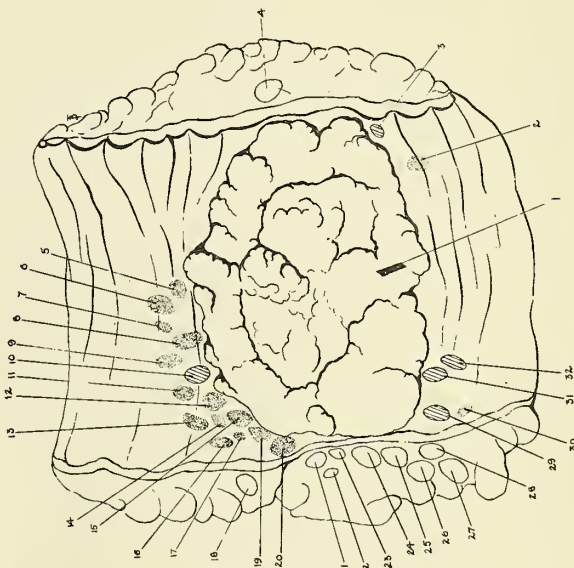


Fig. 19

Fig. 16 (Case 117846), 17 (Case 209414), 18 (Case 143179), and 19 (Case 143179). Drawings representing the size and position of glands and their relation to growth. Dotted circles represent glands without metastasis, behind the intestine; clear circles, glands without metastasis, not behind the intestine; circles with cross lines, glands with metastasis, not behind the intestine.

cinoma, as described by McArthur, producing constriction and consequent obstruction; (3), ulceration of the growths in the lumen of the intestine, causing tenesmus, local pain, and blood and mucus in the stool; (4) extension of the growth through the wall of the intestine, and into other organs, complicated by secondary in-

fection, resulting in pain and partial obstruction; (5) the weight of the tumor mass, causing distortion of the parts with consequent pain and interference with the normal peristalsis of the bowel; and (6) degeneration and formation of scar tissue producing constriction and consequent obstruction.

TABLE 1

Distribution by decades of the 100 cases of carcinoma of the large intestine

|  |    |
|--|----|
| 1 to 10 years.....                       | 0  |
| 11 to 20 years.....                      | 0  |
| 21 to 30 years (21, 26, 29, 29, 29)..... | 5  |
| 31 to 40 years.....                      | 8  |
| 41 to 50 years.....                      | 21 |
| 51 to 60 years.....                      | 42 |
| 61 to 70 years.....                      | 21 |
| 71 to 80 years (72, 75, 76).....         | 3  |

TABLE 2

Group 1. Carcinoma of the large intestine without metastatic involvement of the lymph nodes

| Case   | Sex, Age | Duration of Symptoms<br>Months | Glands |
|--------|----------|--------------------------------|--------|
| 209714 | F-50     | 4                              | 15     |
| 139635 | M-63     | 6                              | 16     |
| 284697 | F-55     | 12                             | 13     |
| 243782 | F-38     | 11                             | 31     |
| 286874 | M-67     | 12                             | 17     |
| 243328 | F-50     | 8                              | 0      |
| 256207 | F-42     | 3                              | 12     |
| 256600 | M-56     | 14                             | 26     |
| 270880 | M-58     | 2                              | 18     |
| 117846 | F-32     | 12                             | 33     |
| 311830 | F-75     | 6                              | 12     |
| 339496 | M-64     | 6                              | 0      |
| 321076 | F-50     | 12                             | 21     |
| 321874 | M-21     | 4                              | 0      |
| 335692 | M-64     | 9                              | 28     |
| 312376 | M-46     | 10                             | 28     |
| 296635 | M-57     | 12                             | 18     |
| 213599 | M-37     | 12                             | 28     |
| 203854 | F-56     | 6                              | 0      |
| 215203 | M-76     | 36                             | 0      |
| 261360 | F-50     | 12                             | 5      |
| 73058  | M-40     | 12                             | 11     |
| 324824 | F-58     | 18                             | 15     |
| 243755 | M-49     | 2                              | 21     |
| 245802 | M-40     | 2                              | 28     |
| 245378 | F-56     | 5                              | 11     |
| 248127 | F-49     | 7                              | 26     |
| 263828 | F-50     | 1                              | 8      |
| 182292 | M-58     | 7                              | 7      |
| 314249 | F-62     | 14                             | 14     |
| 265558 | M-46     | 8                              | 17     |
| 212357 | M-65     | 12                             | 37     |
| 268852 | M-62     | 6                              | 20     |
| 289153 | M-64     | ?                              | 7      |
| 237533 | M-51     | 11                             | 9      |
| 209460 | M-39     | 12                             | 5      |
| 278586 | F-52     | 8                              | 18     |
| 219689 | M-60     | 14                             | 23     |
| 100279 | M-29     | 3                              | 25     |
| 84262  | M-52     | 6                              | 12     |
| 214608 | F-55     | 7                              | 5      |

|        |      |    |    |
|--------|------|----|----|
| 219038 | M-55 | 6  | 28 |
| 296853 | M-66 | 8  | 8  |
| 184460 | F-39 | 18 | 27 |
| 223299 | F-57 | 11 | 16 |
| 240539 | F-64 | 10 | 4  |
| 246503 | F-29 | 6  | 15 |
| 250035 | F-49 | 2  | 11 |
| 251195 | F-57 | 10 | 14 |
| 257681 | F-48 | 1  | 22 |
| 289835 | M-72 | 1  | 8  |
| 68010  | M-58 | 12 | 12 |
| 212902 | F-45 | 9  | 9  |
| 268339 | M-52 | 6  | 12 |
| 261807 | F-26 | 4  | 17 |
| 230039 | F-63 | 0  | 8  |
| 205274 | M-47 | 24 | 10 |
| 219381 | F-50 | 6  | 16 |
| 188149 | M-45 | 4  | 19 |
| 197535 | M-44 | 6  | 37 |
| 191500 | F-65 | 8  | 15 |
| 172055 | F-63 | 12 | 11 |
| 284368 | F-47 | 3  | 11 |

Females 31

Males 32

Average 8.72

15.20

Average age 52.1

TABLE 3

Group 2. Carcinoma of the large intestine with metastatic involvement of one or more of the regional lymph glands.

| Case   | Sex, Age | Duration of symptoms<br>Months | Glands | Glands not<br>involved | Glands<br>involved |
|--------|----------|--------------------------------|--------|------------------------|--------------------|
| 225884 | M-35     | 2                              | 13     | 12                     | 1                  |
| 290052 | M-67     | 3                              | 15     | 14                     | 1                  |
| 262214 | M-52     | 17                             | 7      | 10                     | 7                  |
| 293388 | M-50     | 12                             | 3      | 1                      | 2                  |
| 68010  | M-56     | 12                             | 13     | 10                     | 3                  |
| 289884 | F-42     | 12                             | 7      | 6                      | 1                  |
| 232689 | M-49     | ?                              | 11     | 10                     | 1                  |
| 187449 | M-54     | 6                              | 36     | 33                     | 3                  |
| 187304 | F-49     | ?                              | 10     | 8                      | 2                  |
| 299184 | M-50     | 24                             | 12     | 11                     | 1                  |
| 209414 | M-54     | 12                             | 15     | 2                      | 13                 |
| 212612 | M-46     | 18                             | 15     | 10                     | 5                  |
| 248261 | F-54     | 8                              | 12     | 10                     | 2                  |
| 228847 | F-50     | 6                              | 15     | 14                     | 1                  |
| 212591 | M-60     | 12                             | 16     | 15                     | 1                  |
| 212495 | F-29     | 2                              | 7      | 6                      | 1                  |
| 294795 | F-56     | 2½                             | 20     | 19                     | 1                  |
| 245141 | M-67     | 6                              | 8      | 7                      | 1                  |
| 321367 | M-56     | 3                              | 13     | 11                     | 2                  |
| 295180 | F-51     | 8                              | 24     | 21                     | 3                  |
| 79425  | F-54     | 6                              | 10     | 8                      | 2                  |
| 143179 | M-62     | 6                              | 14     | 4                      | 10                 |
| 146908 | M-57     | 4                              | 42     | 39                     | 3                  |
| 208521 | M-57     | 9                              | 12     | 9                      | 3                  |
| 168215 | F-65     | 12                             | 18     | 17                     | 1                  |
| 315878 | F-31     | ?                              | 18     | 14                     | 1                  |
| 297128 | F-48     | 30                             | 14     | 13                     | 1                  |



|        |      |    |    |    |   |
|--------|------|----|----|----|---|
| 315119 | F-45 | 11 | 25 | 23 | 2 |
| 187084 | F-51 | ?  | 18 | 11 | 7 |
| 90799  | F-58 | 30 | 15 | 13 | 2 |
| 129246 | F-57 | 6  | 32 | 27 | 5 |
| 329174 | F-52 | ?  | 7  | 6  | 1 |
| 298031 | F-60 | 3  | 10 | 9  | 1 |
| 215439 | M-51 | 11 | 12 | 10 | 2 |
| 216233 | M-46 | 12 | 25 | 24 | 1 |
| 213582 | M-60 | 30 | 31 | 30 | 1 |
| 279654 | F-55 | 6  | 17 | 10 | 7 |

Females 18

Males 19 Av. 8.33 16.75 14.16 2.56

Average age 52.1

TABLE 4

Group 3A. Colloid carcinoma of the large intestine without metastatic involvement of the lymph glands

| Case   | Sex<br>Age | Duration of<br>symptoms,<br>Months | Date of<br>operation | Recurrence | Glands<br>not<br>involved | Glands<br>involved |
|--------|------------|------------------------------------|----------------------|------------|---------------------------|--------------------|
| 100279 | M-29       | 3                                  | 2/14/14              | 0          | 25                        | 25                 |
| 223299 | F-57       | 11                                 | 3/ 1/18              | 0          | 16                        | 16                 |
| 245378 | F-56       | 5                                  | 9/25/18              | 0          | 11                        | 11                 |
| 263828 | F-50       | 1                                  | 4/14/19              | 0          | 8                         | 8                  |
| 209714 | F-50       | 4                                  | 10/ 6/17             | 0          | 15                        | 15                 |
| 243782 | F-58       | 11                                 | 1/ 3/19              | 0          | 31                        | 31                 |
| 339496 | M-64       | 6                                  | 11/ 5/20             | 0          | 0                         | 0                  |
| 321874 | M-21       | 4                                  | 6/ 2/20              | 0          | 0                         | 0                  |

Females... 5

Males... 3 Average, 5.6 13.2 13.2

Average age, 40.5.

TABLE 5

Group 3B. Colloid carcinoma of the large intestine with metastatic involvement of lymph glands

| Case   | Sex<br>Age | Duration of<br>symptoms<br>Months | Date of<br>operation | Recurrence | Glands not<br>involved | Glands<br>involved | Glands |
|--------|------------|-----------------------------------|----------------------|------------|------------------------|--------------------|--------|
| 209414 | M-54       | 12                                | 10/ 5/17             | ?          | 2                      | 13                 | 15     |
| 68010  | M-56       | 12                                | 8/ 1/12              | 11½ yrs.   | 10                     | 3                  | 13     |
| 232689 | M-49       | 24                                | 5/31/18              | 4/ 4/19    | 10                     | 1                  | 11     |
| 143179 | M-62       | 6                                 | 10/16/15             | 3/ 1/16    | 4                      | 10                 | 14     |
| 208521 | M-57       | 9                                 | 10/ 2/15             | 0          | 9                      | 3                  | 12     |
| 315878 | F-51       | 30                                | 5/25/20              | 1/ 4/21    | 14                     | 1                  | 15     |
| 187084 | F-51       | 24                                | 10/ 3/18             | 2/25/19    | 11                     | 7                  | 18     |
| 329174 | F-52       | 18                                | 8/ 2/20              | 6/ 2/19    | 6                      | 1                  | 7      |

Females... 3

Males... 5 Average, 16.1 8.85 4.87 13.12

Average age, 51.5.

## CONCLUSIONS

1. Carcinoma of the large intestine occurs most frequently in the sixth decade, but it is

quite common from the third decade on; it occurs about equally in both sexes.

2. Carcinoma of the large intestine metastasizes less frequently than carcinoma of any other part of the gastro-intestinal tract.

3. In this series of 100 cases metastasis occurred most frequently in the sigmoid flexure, and in the other parts in the following order: descending colon, transverse colon, hepatic flexure, splenic flexure, and ascending colon.

4. Carcinomas without local metastasis usually protrude into the lumen rather than penetrate the walls of the intestine.

5. Carcinomas with local metastasis usually extend into the wall of the intestine rather than into the lumen.

6. Metastasis may occur in the liver without a sign of local metastasis.

7. Annular carcinoma is present in nearly 25 per cent.

8. Annular constrictions, due possibly to degeneration and resulting scar tissues, often have the appearance of annular carcinoma.

9. No definite conclusions were reached with regard to the relative frequency of the origin of the growth on the different walls of the intestine because of the marked inflammatory processes which complicated many of the growths.

10. Adenocarcinoma is present in every carcinoma which originates in the large intestine.

11. Colloid carcinoma occurs in about 16 per cent of the cases.

12. Colloid carcinoma seems to appear in two different types of cases, those with short duration of symptoms, or the mildly malignant type, and those with long duration of symptoms or the very highly malignant type.

13. Colloid carcinoma metastasizes and is frequently present in the most highly malignant cases.

14. Colloid carcinoma is very difficult to control after it begins to metastasize.

15. The highest percentage of recurrences is found among the second type of colloid carcinoma.

16. A very high percentage of local glands have metastasis in the second type of colloid carcinoma.

17. Carcinoma of the large intestine fre-

quently shows marked cell differentiation, and tends to limit itself.

18. Cases with little cell differentiation or without cell differentiation in the locally involved glands are frequently shown clinically to be more malignant than those with cell differentiation.

19. Lymph glands may be almost normal in consistency yet palpable and plainly visible to the naked eye.

20. Lymph glands may be only inflammatory, but with such marked cellular infiltration and lymphedema as to simulate large carcinomatous glands, both in size and consistency.

21. Carcinoma usually enters the lymph gland through the lymph sinus at the periphery of the gland, and in early involvement cannot be detected except by systematic microscopic examination.

22. The lower cut-off ends of the glands in the intestinal wall may be mistaken for highly differentiated carcinoma.

23. Very small glands, too small to palpate under ordinary conditions in the abdomen, may be carcinomatous.

24. Local glands with metastasis are usually at the point of greatest extension of the growth, but there are frequent exceptions to this.

25. In many of the more mildly malignant cases, without metastasis, the local glands are larger and more numerous than in the highly malignant cases.

26. In some instances local glands are not large enough to be visible to the naked eye.

27. Very few growths involve more than two or three glands in metastasis, but there may be a large number of large inflammatory glands in the same specimen.

28. Cases in which a large number of glands are involved locally usually show a high degree of malignancy clinically.

29. The size of the growth is no criterion of the presence or absence of metastasis.

30. Only by a systematic microscopic examination is it possible to rule out local metastasis in carcinoma of the large intestine.

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## THE USE AND ABUSE OF THE ELECTROCARDIOGRAPH\*

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Less than twenty years ago, an instrument was devised by Einthoven which leads off the action currents of the heart and records them. American papers about these records were first written in 1910. Since this, the chapters on heart disease have been rewritten and the doctor's vocabulary has acquired new conceptions and new words.

What does the electrocardiogram mean?

Each time the heart beats, a current is generated, which is led off to the surface of the body. These currents are recorded by the electrocardiograph or string galvanometer by means of electrodes at the extremities of the body. There are three tracings in the standard electrocardiogram, known as Leads I, II, and III, because the currents are led off at the extremities, or as derivations (abbreviated D1, D2, and D3). The waves of the electrocardiogram show the passage of an impulse associated with the contraction of the heart muscle from the pacemaker up in the node in the right auricle, through the auricular muscle, along the conducting mechanism of the bundle of His, through the branching of this bundle to the two ventricles and then through the fine network of Purkinje fibres into the ventricular muscle. By measuring the length of the waves and intervals the normal time for conduction of impulses through the different regions of the heart has been found and deviations from the normal can be detected. For example, it has been established that it takes from .12 to .20 of a second for the impulse to pass from the normal pacemaker in the right auricle to the ventricle. A prolongation of that interval means either a lesion or a toxic condition in the conducting mechanism delaying the passage of the impulse. And so the tracing may show a partial block or a complete block of impulses between the auricle and the ventricles; or it may show a delay of impulse to one or the other ventricle; or it may show a destruction of the finer

network of Purkinje fibres going into the heart muscle itself. Each of these conditions gives characteristic signs on the waves of the electrocardiogram.

A few years ago it showed the *pulsus perpetuus irregularis* was caused by an incoordinate fibrillation of the auricles; that the pulse described as intermittent was usually caused by premature beats known as extrasystoles; that an extremely slow pulse with syncope was often due to complete heart-block. And so doctors can in most cases differentiate between the abnormalities in rhythm that are serious in prognosis and those that are of less importance; but there are occasional cases, usually obscure and indeterminate from clinical examination, in which the diagnosis can be made by electrocardiograph only, those in which the intricate myocardial structures, rather than the more easily accessible valve leaflets are involved.

1. The electrocardiogram may corroborate your clinical findings. You may be reasonably sure of your diagnosis of total irregularity, but it gives you a feeling of security to see a tracing showing the fibrillation of the auricle and telling you that digitalis should be used to control symptoms. You recognize premature beats clinically but you read on the electrocardiogram whether they arise in the auricle or in the ventricle. The auricular ones may be followed by more serious disturbances. The ventricular ones are commonly harmless. The electrocardiograph shows preponderance of one ventricle over the other and may help in differentiating between lesions of the left or of the right heart.

2. The electrocardiogram may amplify your clinical findings. You may find the ventricular extrasystole you were expecting but with it an auricular premature beat, too, making the condition more serious. You may find auricular fibrillation along with disturbances of impulse propagation in the ventricle. Uncomplicated auricular fibrillation has a low mortality (30 per cent in three years as compared with 47 per cent in all heart cases in a series reported by Paul D. White) while fibrillation associated with abnormal ventricular waves gave 100 per cent mortality in three years.

3. The electrocardiogram makes diagnoses in

\*Presented before the Northern Minnesota Medical Association, Detroit, Minn., May 24, 1921.

important conditions not recognized by any other means. In delayed conduction between auricle and ventricle, the beat is regular and there is no clinical means of recognition. It means either a disease or a toxic condition of the heart muscle involving the conducting fibres. Digitalis may cause it and always has a tendency to increase it. This condition may become more marked and show as a partial block with dropping out of occasional ventricular beats, or as a complete block. Branch block is an interference with the conduction to one ventricle so that the impulse goes through the other ventricle. Arborization block is a delayed conduction through the Purkinje fibres going into the muscle itself. All of these conditions usually mean serious muscle disease.

Auricular flutter is a regular rapid rate of the auricle, usually at about 300. The ventricle cannot keep up with it and may beat at the rate of 150 or even 75. It is of extreme diagnostic importance and responds definitely to digitalis therapy. It can be discovered by electrocardiograph only. It should be suspected in every tachycardia not otherwise explained.

What is not shown by the electrocardiogram?

Heart sounds are not recorded and so valvular lesions cannot be determined except by the indirect evidence of left or right ventricle preponderance.

The size of the heart-beat or of the pulse wave is not shown. The size of the waves in the electrocardiograph depends on the flow of current. It is caused by the excitation wave that precedes the contraction and not the contraction itself. The size of the heart is not shown though relative increase of one ventricle over the other gives typical curves. If both ventricles are en-

larged as in combined heart lesions, the usual relationship will be maintained and the tracing may appear normal.

Often there is a normal electrocardiogram in a patient with multiple valvular disease with enlargement of all chambers. But the conducting mechanism is unimpaired and the chambers are all enlarged equally. It is possible to have a serious muscle disease without showing signs in the electrocardiogram, probably because the path of conduction is spared. It should be remembered that a blocking of the impulse conduction may be a transient toxic condition instead of a muscle lesion.

How can the electrocardiograph be abused?

Accepting a normal electrocardiogram as positive evidence of a normal heart would be the same as accepting a negative Wassermann as evidence of no syphilis. On the other hand, an abnormal tracing may be due to a temporary condition. The heart may be irregular today and regular tomorrow.

To summarize:

The electrocardiograph should give you important information about a heart that is too rapid or too slow; about an irregularity of doubtful type; about a patient with heart symptoms but no demonstrable heart disease. Positive electrocardiographic signs of disease are of definite value. Normal tracings, however, do not necessarily mean a normal heart. For the electrocardiograph records only the events of impulse initiation and propagation in the muscle and the changes in position of the heart. Like all other graphic methods, it should be considered only as a part of a clinical examination. It gives information of heart muscle disease that you can find in no other way.





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## EDITORIAL

### MISDIRECTED ROUTINE\*

Many hospital, laboratory and x-ray workers, will appreciate what is meant by useless routine: the misdirected conducting of certain tests or their repetition. This statement demands some explanation when hospital staffs are constantly being urged to provide diagnostic equipment, and then, through supervision of record system, to insist on its use. Doctors who have not been in the habit of utilizing laboratory procedures are apt to acquire an ungrounded confidence in their productiveness; to ascribe a finality to pathological findings that is unjustified. A wide series of negative findings cannot offset one definite, accurately observed and interpreted positive finding.

Somehow, the idea has evolved that good diagnosis simply demands the broadcast utilization of routine clinical laboratory and functional tests. This method is weighty, cumbersome and correspondingly ineffectual. Gold is to be found in a particular mountain—the surface and geological indications are favorable. Think of the senseless abuse of the miner's energy or the company's funds, that hurls the

search at the mountainside with the crushing purpose of squeezing the treasure from its hiding place! Gold mining is mainly carried on by following leads and threads or viens, and many a bold and expensive shaft, aimed from overhead, with the hope of luckily striking a productive vein, has been sadly unavailing.

The interpretation of this illustration is more forceful when we analyze the course of an actual patient:

A busy, active, professional man, aged 58, had within a month the benefit of a thorough, routine examination, in an excellent hospital and under competent medical supervision. He was informed, and had a report substantiating his statement, that he was in splendid condition. A general physical examination, with roentgenological studies of the chest and gastrointestinal tract, together with a normal blood pressure, urine and blood, were said to indicate perfect health. Yet, within two weeks he began to have dizzy spells, and noted some tremor in his legs after exertion (golfing), and once noted some numbness and retardation in one leg. Following this thread of definite complaint, it is found that he had had a series of these dizzy spells off and on for six years; the elicitation of his family history shows that his father died at about 75 of progressive senility, with a dry gangrene affecting the toes of one foot. Despite his very abstemious life, careful eye fundus examination showed veins three times their normal width, with narrowed, tortuous, sclerotic arteries, and a roentgen picture of the ankle shows the delicate tracery of an atherosclerotic posterior tibial artery.

You may say that not enough routine was done in the first place; that the eye ground should never be overlooked. This may be so, but the case serves as a good illustration, because many patients are annoyed and some financially wrecked, by enthusiastic diagnosticians. We must get tangible results. Thousands of people send their urine at stated intervals to commercial laboratories, and get in return information that occasionally guides them well. But what of the overpowering majority that get a false sense of security because they feel that the urine is the all encompassing medium, that carries in it all the signals of impending disaster?

Normal blood pressures are the rule in intimal degeneration of the blood vessels, spoken of in the case here mentioned. Yet, behold the security of many individuals, who, like this man, accepted the congratulations of his examiners on this happy finding!

The lesson to be learned helps first in freeing our diagnostic laboratories of needless and misdirected work.

Don't rely on them for "pathognomonic" shortcuts to give us more time to pay homage to the God of laziness.

Let us stand back far enough from the patient to get the invaluable historical leads that properly start us on our search for definite data. Then, one step leading to another, let the search be unabating and unrelenting, even though it may happen to require the examination of the stools daily for a month.

If this is done, the laboratory workers will submit to less railery and become diagnostic assistants, instead of crutches for clumsy clinicians.

E. L. T.

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\*This editorial also appeared in *Hospital Progress* for November.

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### THE DEARTH OF TRAINED NURSES

That the shortage in trained nurses for private cases is on the increase has been noted for some time, particularly by the medical profession.

The ever broadening field of activities offered to the newly graduated nurse is in a large part responsible for this situation. Nursing is a noble profession, but, like the practice of medicine, it is a vocation.

Holding to the ideal exemplified by the first trained nurse, Florence Nightingale, is often difficult when one encounters certain phases of the profession which, to say the least, are inconvenient. The school nurse, tuberculosis nurse and nurse employed in any of the various industrial activities, works a specified number of hours and is through. Those associated with surgeons in their office, who constitute no small percentage of the total, have the same

convenience as to hours. Marriage claims a very appreciable number in the years following graduation, but this has ever been true.

Recently proposed legislation would have included the nursing profession in the maximum eight hour labor law for women. This would have necessitated almost doubling the number training in hospital, and would certainly have complicated the private nursing proposition. A three years training course is admittedly a stiff test of a young woman's physical, mental and moral makeup, and should be and is awarded by a valuable diploma.

Because of the dearth of nurses there is a tendency to advocate lower requirements and standards in nursing generally. Short courses have been instituted, notably in Chicago, where more or less superficial training is concentrated and the product is entitled to do nursing. Some advocate lowering requirements for preliminary education so as to admit grammar school graduates and eliminating the so-called unnecessary scientific trimmings in the nursing course, claiming they are an encroachment on the province of the physician. They argue that this once accomplished, large numbers of highly competent women will flock into the nursing field.

There is no denying that less highly trained women could do equally well some of the work now done by the trained ones. One specially trained in a short course could care for the new-born fully as well as the three-year graduate nurse. Caring for chronic cases is still another instance. These less trained individuals should be distinctly more than the self-made practical nurse and could well be specialists in some particular branch of nursing, but need not demand a specialist's fee, nor, in fact, as high a one as the trained nurse.

This dearth of available trained nurses should certainly not be allowed to lower the standard of the profession known as trained nursing. The preliminary and training requirements should be raised to an even higher level than they are at present, so that the diploma will mean more to the possessor instead of less.



## THE NATIONAL BOARD OF MEDICAL EXAMINERS.

The need for National Board of Medical Examiners has been recognized for many years. The present Board was founded in 1915 and began its work in a small way. Its value to the young graduate depended of course on the number of states and countries that recognized its certificates, and also to the convenience as to the time and location of its examinations. Until recently the disadvantages accompanying the taking of these examinations largely outweighed the value of the certificate. We are glad to further publicity of the following announcement and believe the time is not far distant when every graduate will prefer to take this examination which will in all probability eventually remove all state barriers as to location for the practice of medicine.

"The National Board of Medical Examiners has just completed the first five years work and with it the trial period of its usefulness. The principle which this Board has stood for, namely, the establishment of a thorough test of fitness to practice medicine which might safely be accepted throughout this country and abroad, has been widely accepted. Since this Board was organized by Dr. W. L. Rodman, in 1915, eleven examinations have been held. These examinations have been conducted on the plan of holding at one sitting, a written, practical and clinical test for candidates with certain qualifications, namely a four-year high-school course, two years of college work, including one year of Physics, Chemistry, and Biology, graduation from a Class A Medical School and one year's internship in an acceptable hospital. These examinations have covered all the subjects of the medical school curriculum and have been conducted by members of the Board with members of the profession resident in the place of examination appointed to help them. Such examinations have been held in Washington, Philadelphia, New York City, Boston, Chicago, St. Louis, Rochester, (Minnesota) and Minneapolis. During the war a combined examination was held at Fort Oglethorpe and Fort Riley. There have been 325 candidates examined, of whom 269 have passed and been granted certificates.

Starting with the endorsement of the Council on Medical Education of the American Medical Association, American Medical College Association and various sectional Medical Societies, the recognition of the Army, Navy and Public Health Service Medical Corps of the United States and certain State Boards of Medical Examiners, the certificate is now recognized by twenty states as follows: Alabama, Arizona, Colorado, Delaware, Florida, Georgia, Idaho, Iowa, Kentucky, Maryland, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Pennsylvania, Rhode Island, Vermont and Virginia, the Conjoint Board of England, the Triple Qualification Board of Scotland, the American College of Surgeons and the Mayo Foundation of the University of Minnesota.

There has been such a wide-spread demand for an opportunity to secure this Certificate by examination, that the Board has now adopted and will put into effect at once, the following plan: Part I, to consist of a written examination in the six fundamental medical sciences: Anatomy, including histology and embryology; Physiology; Physiological Chemistry; General Pathology; Bacteriology; Materia Medica and Pharmacology. Part II, to consist of a written examination in the four following subjects: Medicine, including pediatrics, neuropsychiatry, and therapeutics; Surgery, including applied anatomy, surgical pathology and surgical specialties; Obstetrics and Gynecology; Public Health, including hygiene and medical jurisprudence. Part III, to consist of a practical examination in each of the following four subjects: Clinical Medicine, including medical pathology, applied physiology, clinical chemistry, clinical microscopy and dermatology; Clinical Surgery, including applied anatomy, surgical pathology, operative surgery, and the surgical specialties of the diseases of the eye, ear, nose and throat; Obstetrics and Gynecology; Public Health, including sanitary bacteriology and the communicable diseases.

Parts I and II will be conducted as written examinations in Class A Medical Schools and Part III will be entirely practical and clinical. In order to facilitate the carrying out of Part

III, subsidiary boards will be appointed in the following cities, Boston, New York, Philadelphia, Minneapolis, Iowa City, San Francisco, Denver, New Orleans, Baltimore, Galveston, Cleveland, St. Louis, Chicago, Washington, D. C., and Nashville, and these boards will function under the direction of the National Board. The fee of \$25.00 for the first part, \$25.00 for the second part and \$50.00 for the third part will be charged. In order to help the Board the Carnegie Foundation has appropriated \$100,000.00 over a period of five years.

At the Annual Meeting held June 13th, of this year in Boston, the following officers were elected, M. W. Ireland, Surgeon General, President; J. S. Rodman, M. D., Secretary-Treasurer; E. S. Elwood, Managing Director.

Mr. Elwood will personally visit all Class A Schools during the college year to further explain the examination, etc., to those interested. Further information may be had from the Secretary-Treasurer, Medical Arts Building, Philadelphia."

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## NEWS OF THE HOSPITALS

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New apparatus has been added to the clinical and x-ray laboratories of St. John's Hospital, St. Paul, and the nurses' class room remodeled and enlarged. Eight new nurses have recently entered the training school.

The staff of St. Joseph's Hospital, Brainerd, has recently been newly organized and the officers are as follows: Chief of Staff, Dr. J. A. Thabes; Vice Chief, Dr. W. B. Kelly, of Aitkin; Secretary, Dr. B. I. De-rauf, of Brainerd. The latter is in charge of the offices of the Northern Pacific Beneficial Association opened in the First National Bank Building when the Northern Pacific Hospital was removed to St. Paul.

Drs. Plondke and Hilger, of St. John's Hospital, have recently returned from a hunting trip.

Realizing the increasing demand for nurses training in orthopedics and pediatrics the Minnesota State Hospital for Indigent Cripples and Deformed Children announces that they are now offering a course for post-graduates and affiliates. Course covers a period of from two to six months, especially emphasizing physiotherapy which plays so important a part in the treatment of infantile paralysis cases, orthopedic surgery, infant feeding, occupational therapy, dispensary and out-service department. The State Hospital

is well equipped with all modern and up-to-date appliances and has a capacity of 200 beds. Each department is supervised by women who have had extensive training in their particular line of work. Nurses and hospitals interested may address further inquiry to the Superintendent, State Hospital, Phalen Park, St. Paul, Minnesota.

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## OBITUARY

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### CHARLES EASTWICK SMITH, JR.

The death, on July 30, 1921, of Doctor Charles Eastwick Smith, Jr., (better known to his many friends as Carl Smith) took from us one who was an example of a new type among medical men. Early in his professional career, he became interested and active in the broader aspects of medicine, maintaining this interest as well as active participation in public health work until his death.

Charles Eastwick Smith, Jr., was born in St. Paul, on January 15th, 1882, the son of Doctor Charles Eastwick Smith, and grandson of Doctor Franklin Smith who began his practice in St. Paul in 1855. Having received his elementary education in the public schools of St. Paul, Carl, at an early age, was sent to the Siglar School in New York state. His college preparation was made at the Taft School, Watertown, Connecticut, and his college work was done at Yale, where he received his B. A. degree in 1904. Returning to Minnesota in that year, he spent two years in the Medical School at the University of Minnesota, and then completed his work at the University of Pennsylvania, where he graduated in Medicine in 1908. After a year of internship at St. Joseph's Hospital, St. Paul, he began practice in this city in 1909.

Early in his practice, Doctor Smith began to do public health work, serving from the beginning of his practice for two years as Assistant City Physician. From 1914 to 1917 he held office in the St. Paul City Health Department, then transferring his activities to the State Board of Health, being at first Assistant Secretary, and later Executive Secretary of that body, which latter office he held until shortly before his death. He assisted largely in the installation of the Headquarters of the Fourth District of the United States Public Health Service which was established in St. Paul, early in the spring of 1919.

In June, 1909, he married Miss Esther McDavitt, daughter of Dr. Thomas McDavitt, of St. Paul, by whom he is survived. He is also survived by his son, Charles Eastwick Smith, III, two daughters, Esther and Mary, both parents, and one sister, Miss Mary Smith of St. Paul.

Doctor Smith joined the Ramsey County Medical Society in March, 1909, and served as its Secretary-



Treasurer from 1912 to 1917 inclusive. For practically this same time he was Managing Editor of the St. Paul Medical Journal, being the last incumbent of that office.

During his term as Secretary, the Society showed remarkable growth and more than once it has been remarked that in this period, the Society experienced a marked awakening of the interest which had formerly characterized its meetings.

In addition to his duties as Secretary-Treasurer and Managing Editor of the Journal, Doctor Smith found time to take an active interest in all proceedings of the Society. He was always interested in the library, and at the time when this was moved from the Lowry Annex to its present quarters, he was of great assistance in straightening out the confusion in which the material was found after it had been moved.

A clear and logical thinker, Doctor Smith had unusual ability to present a subject in a definite, clean-cut and concise manner. He was decidedly original in his mental processes. Interested in a great many things of many sorts, he had ideas and suggestions to make, of a variety which to most people was almost confusing. Many of his suggestions might prove on examination to be not feasible, but a large number of them proved to be of genuine merit. His acute mind, wide interest, and quick repartee were always a source of enjoyment to his friends.

Never of robust build, an attack of pericarditis which he sustained in 1911 appears to have impaired his heart. A condition of bronchiectasis and emphysema gradually developed, and although sanitarium treatment for several months in 1917 appeared to be of benefit, his activities during the last few years were seriously interrupted. Several attacks of pneumonia increased the gravity of his condition, and in the hope of betterment of health, some time was spent in the southwest, but without avail. The common impression that the cause of death was pulmonary tuberculosis is entirely erroneous.

In conclusion, we bear whole-hearted testimony to Doctor Smith's ability and sincerity. A man of positive opinion, it was inevitable that some should be unfriendly, if not at enmity, with him, but the same qualities which alienated a few, attracted many others.

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#### ARCHIBALD CUNNINGHAM FAIRBAIRN

Archibald Cunningham Fairbairn was born in Brockville, Canada. After completing his studies in literary school, he studied medicine in Queens College, Ontario, in 1871, and Royal College Physicians and Surgeons, 1873. After graduation, he spent a year

in post graduate work in Paris and London. Speaking French fluently, he greatly enjoyed his work in Paris. Returning, he located in Sacketts Harbor, N. Y. After a few years' practice there he moved to Minneapolis where he remained until his death. After two years practice he returned to Sacketts Harbor to marry Fannie Sackett, daughter of the late General Sackett. She was a woman of unusual culture and refinement. She died a few years before the doctor.

Dr. Fairbairn soon became one of the leading practitioners of the city, a man of fine presence and great culture. He served two terms as county coroner and organized that office on a business basis, and for the first time accurate records were kept. He served on the first board of medical examiners and for six years examined in surgery. He served on the board of directors of the Minneapolis Atheneum from its merging with the Public Library up to his death. He was noted for his kindness and sympathy with young doctors coming here to locate, and on holidays made it a practice to invite young bachelor doctors to dine with him at his home. Many of these men now grown old, speak of the appreciation and enjoyment they felt at such kindness shown them, some of them entire strangers of the doctor. He was a great student, possessed a fine library and kept abreast of the times by taking the leading medical journals. He joined the Hennepin County Medical Society soon after he came to Minneapolis and was faithful in his attendance on this as well as the State Society. He was secretary of the County Society for two terms and his minutes (now unhappily lost with all early records) were full and complete. His ethical standard was high at a time when ethics were largely ignored. He was a type of all-round practitioner before the separation into specialties. He was a daring and careful surgeon, performing one of the first laparotomies in this city. His skill as an obstetrician was recognized in the community and he enjoyed a large practice in this specialty.

Several years ago while doing an intubation in a case of diphtheria, Dr. Fairbairn had an infection from puncture of his thumb and was confined for months, and very nearly lost his life. He never recovered entirely, suffering from partial optic atrophy and neuritis. His death was due to carcinoma of the oesophagus and pancreas.

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Stanley H. Haynes, Minneapolis; Rush Medical College, Chicago, 1920; until July 1921, on the staff of the Lakeside Hospital, Cleveland; died, August 8, following an operation at the Northwestern Hospital, aged 28.

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## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The Annual Meeting of the Southern Minnesota Medical Association will be held at Mankato, Minnesota, December 5th and 6th, 1921.

The program will measure up to the high standard established by the Southern Minnesota Medical Association; the speakers who will present papers are:

Dr. N. Allison, St. Louis, Missouri, "A Study in Bone Atrophy."

Dr. A. W. Adson, Rochester, Minnesota, "Surgical Aspects of Neurological Surgery."

Dr. H. M. Connor, Rochester, Minnesota, "Serous Effusions of the Chest."

Dr. F. E. Leavitt, St. Paul, Minnesota, "Fifty Caesarian Sections."

Dr. C. J. Rowan, Iowa City, Iowa, "The Causes of Failure of Operations for Chronic Appendicitis."

Dr. C. R. Ball, St. Paul, Minnesota, "Psycho-Therapy."

Dr. J. C. Masson, Rochester, Minnesota, "Retro-peritoneal Lipomata."

Dr. R. A. Barlow, Rochester, Minnesota, "Recognition of the Sphenopalatine Ganglion."

Dr. B. S. Gardner, Rochester, Minnesota, "The Dental Examination."

Dr. A. C. Baker, Fergus Falls, Minnesota, "The Treatment of Empyema."

Dr. W. G. Workman, Tracy, Minnesota, "Cystic Disease of Bone."

Dr. E. J. Huenekens, Minneapolis, Minnesota, "Some Simple Factors in the Health of Older Children."

Dr. E. Z. Wanous, Minneapolis, Minnesota. Title to be given later.

The Minnesota Pathological Society of the University of Minnesota Medical School met Tuesday evening, October 18, 1921. Dr. E. L. Opie delivered the annual address.

The fall meeting of the Upper Mississippi Medical Society was held at Wadena on October 11th. Papers were presented by Dr. Fred Adair, Minneapolis; Dr. Geo. M. Waldie, Todd County Sanitorium, and Dr. T. L. Davis, of Wadena.

The Mower County Medical Society held their fall meeting at Austin, September 23rd. Dr. Frederick J. Plondke, of St. Paul, addressed the meeting.

The fiftieth annual meeting of the American Public Health Association will take place in New York City November 8th to 19th, with headquarters at the Hotel Astor. This meeting will be conducted under the joint auspices of the Department of Health of

the City of New York, and is expected to outstrip the similar Health exposition held in Chicago a year ago where over one hundred thousand individuals attended. There will be a series of educational exhibits in which instruction in the feeding of children will be presented by Dr. R. S. Copeland, Health Commissioner of the City of New York.

## OF GENERAL INTEREST

Dr. Frank Whitmore and Miss Louise Bishop, both of St. Paul, were recently married.

Dr. Frederick H. Dubbe, of New Ulm, Minn., was married to Miss Lillian Steinke, of Minneapolis, in July.

Dr. A. H. Kegel, of the Mayo Clinic, has gone to Chicago to engage in the practice of surgery, with offices at 5 North Wabash avenue.

Dr. P. K. Dahl, of Minneapolis, has accepted the position of medical director of the Jordan Sulphur Springs Sanitarium at Jordan, Minn.

Dr. W. J. Kucera, of Hopkins, has gone to Chicago and New York where he will take post-graduate work in eye, ear, nose and throat diseases.

Dr. Gustaf Edlund, of St. Paul, has recently completed his internship at the Miller Hospital and has opened offices at Snelling and Selby Avenues where he will engage in general practice.

Dr. Stella L. Wilkinson, of Duluth, has gone to Philadelphia where she will take a year's post-graduate work in gynecology and obstetrics at the Graduate School of Medicine of the University of Pennsylvania.

Dr. and Mrs. P. C. Pilon have returned to Paynesville from an extended trip through Belgium, France and Switzerland. Dr. Pilon will resume his practice, devoting his time to surgery, consultation and general work.

Dr. George W. Frasier has lately returned from Chicago where he has been taking post-graduate work. His offices will be at 205 Fergusson Building, Duluth, where he will specialize in urology, genitourinary diseases and dermatology.

Dr. H. P. Bacon, of Milaca, has gone to Minneapolis to take up his duties in the government service as medical superintendent of the Minneapolis district for disabled veterans and government insurance of ex-service men. Dr. H. T. Norrgard is in charge of his practice at Milaca.

At the regular meeting of the Interurban Academy of Medicine held in Duluth September 21st, a paper and demonstration was given on "Fractures near the Shoulder Joint," by Dr. A. J. Braden. A paper was also presented by Dr. E. L. Tuohy on "Mitral Stenosis and Associated Constitutional Phenomena."

Dr. G. Brelsford, medical director at Sunnystrest



Sanatorium, Crookston, has returned from a trip to St. Louis, where he went to attend the annual meeting of the Mississippi Valley Medical Association. Dr. Bosworth, of St. Paul, who is at the head of the tuberculosis work in this state, was elected president of the association.

Dr. Karl H. Van Norman, first assistant director of Johns Hopkins Hospital, Baltimore, was recently appointed head of the Miller Hospital, St. Paul. Dr. Van Norman succeeds Dr. L. B. Baldwin who resigned a short time ago. Dr. Baldwin is also head of the University Hospital and will now devote all of his time to that institution.

Dr. Thomas S. Roberts, Professor of Ornithology and Associate Curator of the Zoological Museum of the University of Minnesota, presented a lecture on Itasca Park, Friday, September 23, in the lobby of the Mayo Clinic. The lecture was under the auspices of the Mayo Foundation Chapter of Sigma Xi and the Rochester Unit of the Minnesota General Alumni Association.

The Supreme Court of the United States has recently affirmed a judgment of the Supreme Court of Minnesota sustaining one construing the state statute making it unlawful for a physician to furnish certain narcotic drugs out of his personal stock. According to the state law it is lawful to furnish an addict a prescription for a narcotic but not the drug itself. The law makes a distinction and draws the line here. While he must obey the law it is he who must decide the moral question involved in each individual case.

## NEW AND NON-OFFICIAL REMEDIES

During September the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

### The Abbott Laboratories:

Procaine-Adrenalin Hypodermic Tablets No. 2.

### Dry Milk Co.:

Protolac.

### Hynson, Westcott and Dunning:

Tablets of Benzyl Succinate—H. W. and D.

### Intra Products Co.:

Ampules Ven Sterile Solution Mercury Oxycyanide 0.008 Gm.

Ampules Ven Sterile Solution Mercury Oxycyanide 0.016 Gm.

### Lederle Antitoxin Laboratories:

Acne Combined Vaccine.

Mead Johnson and Co.:  
Casec.

### N. Y. Intravenous Laboratory:

Loeser's Intravenous Solution of Mercury Oxycyanide.

### Seydel Mfg. Co.:

Benzyl Succinate—Seydel.

### Nonproprietary Articles:

Benzyl Succinate.

Calcium Caseinate.

## NEW AND NONOFFICAL REMEDIES

**Beebe Protein Milk.**—Eiweiss Milch of Finkelstein.—A modified milk preparation having a relatively low content of carbohydrate and fat and a relatively high protein content. Each 100 Gm. contains approximately solids 10.2 Gm., carbohydrate 2.5 Gm., protein (casein) 5.3 Gm., fat 1.6 Gm., and ash 0.8 Gm. The acidity is stated on each package. The high protein content of protein milk is claimed to act as a preventive of fermentation and to serve as a medium in which a change in the intestinal flora takes place. Protein milk is said to be especially indicated in gastro-intestinal disorders of infants, accompanied by fermentation and diarrhea. Beebe Laboratories, Inc., St. Paul, Minn.

**Beebe Modified Buttermilk.**—Buttermilk with Flour.—Buttermilk modified formula of Langstein and Meyer.—Buttermilk containing flour partially dextrinized by heat.—Each 100 Gm. contains approximately: total solids 9.7 Gm., carbohydrate 4.7 Gm., protein 3.3 Gm., fat 0.6 Gm., and ash 1.2 Gm. The acidity is stated on each package. Beebe Modified Buttermilk is offered as a means of combating intestinal fermentation by modifying the intestinal flora. Since it contains several forms of carbohydrates which have different periods of digestion, it is believed to afford an opportunity of assimilation without over-taxing the digestive powers. It is stated to be indicated in digestive disturbances of children and adults characterized by milk dyspepsia, fat intolerance, eczema and vomiting. Beebe Laboratories, Inc., St. Paul, Minn.

**Mercuric Oxycyanide.**—For a description see New and Nonofficial Remedies 1921, p. 194. Mercuric Oxycyanide has been proposed as a substitute for mercuric chloride. Its antiseptic power is said to be greater and it is claimed to be less irritating than mercuric chloride because it does not act on albumin to the same extent. Representative syphilographers differ as to the use of mercuric oxycyanide intravenously. Some believe that its use should be limited to hospitals; others that it has no advantage over other and safer methods of administering mercury, while others consider it safe and valuable. But all are in accord that its safe use requires experience. Mercuric oxycyanide may be administered subcutaneously, intramuscularly or intravenously in the same doses as mercuric chloride.

**Loeser's Intravenous Solution of Mercury Oxycyanide.**—Each ampule contains 5 c.c. of solution, representing 0.008 Gm. mercuric oxycyanide N. N. R. New York Intravenous Laboratory, New York.

**Ampules Ven Sterile Solution Mercury Oxycyanide, 0.008 Gm.**—Each ampule contains 5 c.c. solution, representing 0.008 Gm. mercuric oxycyanide, N. N. R. Intra Products Co., Denver, Colo.

**Ampules Ven Sterile Solution Mercury Oxycyanide, 0.016 Gm.**—Each ampule contains 5 c.c. solution, representing 0.016 Gm. mercuric oxycyanide, N. N. R. Intra Products Co., Denver, Colo. (Jour. A. M. A., Sept. 10, 1921, p. 863).

**Calcium Caseinate.**—Calcii Caseinas.—Casein from cow's milk, rendered partially soluble by combination with calcium and containing not less than 1 per cent of calcium. The diarrheal diseases of infancy are now generally treated by dietetic measures. A useful food may be made from the curd of milk and diluted buttermilk, the resultant mixture containing a moderate amount of fat, a small amount of sugar and a large amount of protein (casein) and salts, particularly salts of calcium. A mixture of calcium caseinate and milk is also used. For children, calcium caseinate is mixed with milk and water or milk and gruel in the proportion of 10 Gm. calcium caseinate and one pint of the liquid and the mixture boiled. Calcium caseinate is a yellowish powder, free from rancid or sour odor. With warm water it forms a turbid suspension. Calcium caseinate must not contain more than 10 per cent of moisture, nor more than 2.5 per cent of fat and not less than 14 per cent of nitrogen.

**Casac.**—A brand of calcium caseinate. N. N. R. Meade Johnson and Co., Evansville, Ind.

**Benzyl Succinate.**—Benzylis Succinas.—The dibenzyl ester of succinic acid. Benzyl succinate lowers the tone of unstriated muscle, its action being similar to benzyl benzoate in this respect. It is superior to benzyl benzoate in being less irritating, less nauseating and in containing a greater proportion of benzyl radicle. Its use has been suggested as a renal, biliary, uterine and intestinal colic, excessive intestinal peristalsis, dysmenorrhea, hiccough and other spasms of unstriated muscle. Its clinical use is still in the experimental stage. The dose is 0.3 to 1.0 Gm. Benzyl succinate is a crystalline, odorless and almost tasteless powder. It is almost soluble in water, but soluble in alcohol.

**Tablets of Benzyl Succinate—H. W. and D.**—Each contains benzyl succinate, N. N. R., 5 grains. Hynson, Wescott and Dunning, Baltimore, (Jour. A. M. A., Sept. 25, 1921, p. 1023).

#### PROPAGANDA FOR REFORM

**Thyroid in Obesity.**—J. H. Means carried out studies which show that the basal metabolism is normal in cases of simple obesity. The widespread treatment of obesity by the administration of thyroid preparations is a device for raising metabolism to an abnormal level. The treatment of simple

obesity by producing a state of hyperthyroidism has recently been designated as pernicious by Means. Simple obesity can now readily be differentiated from the obesity due to endocrine disorders by determination of the basal metabolism. If this is normal, weight reduction should not be attempted by the use of thyroid (Jour. A. M. A., Sept. 3, 1921, p. 792).

**A New Selenium Cancer Cure.**—Medical Journals have received "news items" from the "Medical News Bureau" (D. E. Woolley, manager) which announce that for the purpose of further developing methods of control and treatment of disease by the use of selenium and tellurium, the Basic Cancer Research has been organized and a laboratory established at 847 Union St., Brooklyn. Newspapers, on the other hand, have received free publicity matter from the Cosmopolitan Research Society (D. E. Woolley, secretary) according to which this society has been founded to investigate and develop methods for the treatment of cancer. It is further stated that "Dr. Frederic Klein, the eminent authority on urology and the chemistry of cancer, has evolved a new colorimetric test which is the most wonderful and valuable discovery in the diagnosis of cancer and various other diseases." Klein is the gentleman who made "Sulpho-Selene" a cancer "cure" which the Council on Pharmacy and Chemistry refused recognition some years ago. Is "Sulpho-Selene" to be resurrected? (Jour. A. M. A., Sept. 3, 1921, p. 805).

**Treatment of "hay fever."**—Although the essential features of the etiology of "hay fever" are believed to be understood, the treatment is still largely of the hit or miss type. Preparations of mixed pollens are distributed by commercial houses and used by physicians in the hope that some ingredient will prove to be potent. Several facts seem at length to be so well established that they may serve almost as axioms in the clinic of hay fever. One of these is that although the offending pollens vary in different parts of the world as well as at different seasons, the number chiefly responsible for the attack in any single locality is comparatively small. Hence it becomes the duty of the physician to familiarize himself with the offending pollens in his locality or the locality whence his patients hail. Fortunately I. C. Walker has reported on the pollens which are responsible for "hay fever" in the New England states; G. Selfridge on those in California; K. K. Koessler for Illinois, and W. Scheppegegrell for the Southern states. It is important that for each case of "hay fever" the offending pollen should be determined by skin tests and also that the treatment should be preseasonal (although treatment during the season may sometimes benefit). In extenuation of the frequent failure to relieve patients, it is to be noted that certain persons have symptoms ranging from sneezing to asthmatic attacks due to the odors of flowers that have no pollen as well as to the pres-



ence of nonspecific factors in the respired air. Obviously, pollen extracts are of no avail in such cases (Jour. A. M. A., Sept. 3, 1921, p. 791).

**The Expensive "Poor Man's Medicine."**—A favorite argument of the nostrum exploiters, advanced when threatened with restrictive legislation or taxation, is that "patent medicines" are the poor man's medicine. Never had a pretension a flimsier basis of fact. The purchaser who buys a bottle of Dr. Quack's Quick Cure does not realize that about 75 cents of his dollar has been expended by Dr. Quack in an effort to convince him that he is suffering from something for which "Quick Cure" is a sure-shot remedy. The abolition of "patent medicine" advertising would do much to abolish the making of hypochondriacs by suggestion and would result in a great decrease in all drug taking. In addition, if John Doe purchased a simple home remedy, he would have to pay for the cost of the medicine only and not for an expensive advertising campaign to promote its sale (Jour. A. M. A., Sept. 10, 1921, p. 867).

**Diphtheria Preventive Measures.**—It seems likely that the securing of widespread immunity is to be an important aim in the prevention of diphtheria. In this work the Schick test, whereby the existence of immunity or susceptibility to diphtheria can be determined with ease and precision, seems destined to play an important part. Thousands of tests have been applied to school children of New York. Further, in the recent test of more than 52,000 school children of New York, those who gave a positive test were injected with toxin-antitoxin mixture to secure active immunization. If the medical profession accepts the contention that the Schick test is a reliable indication of the susceptibility to diphtheria and, further, that the currently proposed methods of toxin-antitoxin injections are effective in developing a lasting immunity, a great step in progress will have been made (Jour. A. M. A., Sept. 24, 1921, p. 1025).

#### NOTICE

Minnesota Medicine will publish from time to time reports of unusual or particularly interesting cases. The reports should be submitted directly to the editorial office and should be carefully prepared.

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

F. J. HIRSCHBOECK,  
DULUTH CLINIC, DULUTH

THOMAS A. PEPPARD  
LA SALLE BLDG., MINNEAPOLIS

**AN EVALUATION OF THE ALLEN METHOD OF TREATMENT OF DABETES MILLITUS:** John R. Williams, (Amer. Jour. of the Med. Sc., July 1921.) discusses the methods of diagnosing and treating diabetis mellitus prior to and following the year 1915, at which time a change occurred due to the experimental work of Frederick M. Allen. He shows that clinical observations and statistics on diabetes made prior to 1915 are grossly inaccurate as it was commonly assumed that individuals whose urine reduced a copper solution under certain conditions had diabetes. Since that time blood chemistry and studies of the respired air have supplemented the older clinical methods of studying the metabolism. This has resulted in more accurate and trustworthy clinical observations.

The method of study employed in the author's clinic has been along the following lines: On admission, physical examination, a careful routine chemical study of the blood, including blood sugar, urea, creatinin, cholesterol and blood bicarbonate, Wassermann test and cell examination. If any of these elements are present in abnormal amounts the test are repeated every two or three days. The urine is examined daily. The food intake is regulated carefully on a basis of the blood sugar level. The diet is kept low, until the blood sugar level becomes normal, and then cautiously increased while the blood sugar level remains normal. Fast days are rarely used. Instead rest days in which the diet is decreased one-half or one-third are employed. Supplementing these observations, instruction is given the patients in the elements of food chemistry, preparation of food and personal hygiene.

He discusses the immediate and ultimate value of the treatment and answers the following questions:

1. Does the method ever restore the diabetic to health with power to use the unlimited quantities of food? It is highly improbable that a complete cure and the use of an unlimited diet can be accomplished.

2. Can severe cases always be kept from failing by rigorously following the method? Many can be kept alive, although it may be necessary to constantly readjust and maintain the diet at exceedingly low levels. A certain number of cases will succumb in spite of all fasting and underfeeding.

3. Does the method of undernourishment improve the physical condition of the diabetic enough to

make the sacrifice and expense worth while, or does it merely increase or prolong the misery occasioned by the disease? If patients properly regulate their daily activities so as not to exhaust themselves they can live with a fair degree of comfort and with greater freedom from symptoms for a much longer time than if treated by any other method.

4. Does the use of the Allen treatment add materially to the expectancy of life of the diabetic? This depends on the severity of the diabetic, complications or associated diseases and the faithfulness with which the method is adhered to. His clinical impression is that life is materially lengthened by the treatment.

He presents a series of sixteen tables, with comments on each, and gives the following conclusions from his studies:

1. Statistics as to the prevalence of diabetes, cures obtained and other data, based on former and inaccurate and incomplete methods of study are untrustworthy. It is quite impossible therefore to compare with fairness results obtained by the use of the Allen method and results obtained by methods formerly in use.

2. In spite of these difficulties an extended clinical experience covering the use of all known forms of diabetic treatment justifies the conclusion that the Allen treatment is a distinct clinical advance. While permanent cures are not obtained, nevertheless patients for a considerable time are much benefited.

3. It is difficult to say how much is added to the expectancy of life of the diabetic by this treatment. In young people in whom the disease is most serious, it would appear that it is at least doubled. Middle aged and elderly diabetics who are not too seriously afflicted with complications and when faithful to the treatment can probably survive the life-expectancy of the average normal individual.

4. The Allen method is of the greatest service when instituted early in the disease. Like tuberculosis and cancer, diabetes should be recognized and thoroughly treated in its incipency. Most of the failures in its use are due either to serious complicating disease or more frequently to unfaithfulness on the part of the patient. In the majority of cases its value is in inverse proportion to the seriousness of the failure of metabolism.

PAUL G. BOMAN.

**OCCULTISM WITH PARTICULAR REFERENCE TO SOME PHASES OF SPIRITISM:** Charles K. Mills, (*The Amer. Jour. of Med. Sc.*, July 1921.) The Philadelphia Neurologist reviews in this article a subject which does not come entirely in the category of medically useless knowledge. He defines the term "mysticism" as commonly used, to be more or less synonymous with occultism.

The horrible sacrifice of lives during the world war acted as an exciting cause, but back of that there is a more profound reason—"a resurgence of that which is primitive." The terrible calamities of war aroused instincts and emotions and removed men, for a time, from the control of sound reason. Crimes, so prevalent today, he states are best explained psychologically as a turning, under peculiar stress, to instinctive tendencies.

The question naturally arises: What kind of men interest themselves in spiritualism? Some famous scientists have become enthusiastic supporters of spiritualism. He characterizes these men as leading lives in which reason and investigation pursue their way side by side with mystic tendencies. These men, while performing valuable scientific investigations on the one hand, nevertheless give evidences of marked mystical, or more plainly, instinctive and emotional tendencies not subjected to the usual intellectual control.

Ghosts are intimately associated with spiritualism in the minds of the public. He calls attention to the fact that many ghost stories have clearly fraudulent features. These are explained on the theory of hallucination, leaving out consideration of the definitely insane. Apparitions, to his experience in the majority of cases, occur in the period preceding deep sleep or in the period immediately after. Visual and other sensory hallucinations, it should be remembered, are indications of disordered cerebral action.

The so-called psychics, with their well known temperaments or well known constitutional tendencies, are of course easily influenced by mystic impressions. Concentration or disturbance of attention of spiritualists about their table may, and sometimes does, bring about muscular action induced by hypnotic phenomena of the auto or hetero suggestive type, so commonly misinterpreted.

Dr. Spiller characterizes men whom he has seen acting the part of mediums as "fat or fragile, sleek or frowzy!"

J. C. MICHAEL.

**CLINICAL INVESTIGATION OF THE PHENOL-SULPHONEPHTHALEIN TEST:** W. F. Braasch and E. C. Kendall, (*Jour. of Urol.* Feb. 1921.) The authors recognize the phenolsulphonephthalein test as a distinct clinical aid in the measure of kidney efficiency, but feel that the tendency has been to interpret every diminished phenolsulphonephthalein output as indicating actual impairment of kidney function. Other extra-renal factors must be considered in correctly interpreting the results of this test. A study of these factors was felt necessary because of the fact that the two hour phenolsulphonephthalein return following intramuscular or subcutaneous injection was frequently lower than other clinical data would indicate.



The investigation of these extra renal factors was carried out along two lines:

(1) to determine whether or not any conditions arise in the tissues of the human organism during which the phenolsulphonephthalein can be actually destroyed before it reaches the kidney and can be excreted by it. It was found that the phenolsulphonephthalein is destroyed in the tissues in the absence of oxygen, but that clinically the destruction of the phenolsulphonephthalein in explaining the low phenolsulphonephthalein output can be excluded in any cases in which a condition of cyanosis is not obvious to the eye.

(2) to investigate the possibility of the simple retention of the phenolsulphonephthalein in tissues other than the kidney. This study was carried on in the main by comparing the results secured following intravenous injection of the dye with those following intramuscular or subcutaneous injection. More interesting results were obtained in this particular and are summarized by the authors as follows:

1. The clinical problem involved in the phenolsulphonephthalein test may not be alone whether the kidney itself is capable of excreting it but whether the kidney has the chance to excrete it.

2. Patients with urinary obstruction undergoing preparation for prostatectomy will frequently have a low phenolsulphonephthalein output following intramuscular injection and a normal output following intravenous.

3. The intramuscular injection probably gives a more accurate index of the condition of the tissues, but the renal capacity is best estimated after intravenous injection.

4. When true nephritis with actual destruction of renal cells exists there is but little difference in output following intramuscular and intravenous injection.

5. The extent to which phenolsulphonephthalein is retained in the tissues is influenced by the degree of acidosis. If rendered alkaline the tissues will readily liberate it.

6. Following alkalization of the urine the phenolsulphonephthalein output with intramuscular injection is apparently higher.

7. With nephritis alkalization of the urine has but little effect on the output.

8. In the presence of cardiac insufficiency accurate estimation of the renal function is obtained best by intravenous injection. The difference between the intramuscular and intravenous output offers a fair index of the comparative degree of cardiac and renal impairment.

L. S. YLVISAKER.

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

ARCHIBALD L. McDONALD,  
FIDELITY BLDG., DULUTH.

ALBERT G. SCHULZE,  
LOWRY BLDG., ST. PAUL.

**A STUDY OF CHRONIC ENDOCERVICITIS:** Mathews. (Surg. Gyn. and Ob. Vol. 32, No. 3.) The author refers to the work of Curtis and Stumdorff in considerable detail. The anatomical peculiarities of the cervical mucosa with its deep racemose glands render this region more susceptible to infections. Cervicitis may be primary, or less often is secondary to infection in the uterus or vagina. Etiology includes trauma, from lacerations, instrumental dilatation, curettage, and the use of stem pessarys. Causal organisms in the use of stem pessarys. Causal organisms included; Gonococcus, Staphylococcus, Streptococcus and B. Coli. Pathologically there is an eversion of the columnar cervical epithelium with the formation of a so-called "Erosion." The glands become dilated and closed forming the Nabothian follicles. There is general hypertrophy of the stroma with round cell infiltration. The symptoms and course vary with the individual. There is persistent leucorrhoea, increased before and after menstruation. The author holds that infection often extends into the parametrium and causes various forms of pelvic inflammatory disease. There is frequently thickening of the uterosacral fascia and menstrual backache. There may develop a permanent sterility due to cervical infection.

**Treatment:** The author has little faith in local palliative measures. He describes in detail the Stumdorff operation with excision of the cone-shaped, gland bearing cervix and, plastic repair. Results: of 200 patients with severe endocervicitis operated on at least six months ago! 64% were cured, 24% improved and 8% unimproved.

ARCHIBALD L. McDONALD.

**MISSED ABORTION:** Rongy, (Surg. Gyn. and Ob. Vol. 33, No. 2.) The average pregnant woman is rarely attracted to pathological conditions unless these are accompanied by pain, and is interested only in two periods; quickening and labor. Death of the fetus may occur many weeks or months prior to being expelled, a fact of medico-legal significance. There is a small amount of literature on missed abortion and lack of agreement as to definition. According to Frankl and Duncan it includes all cases of death of the fetus prior to viability and its retention within the uterus to the expected date of labor or beyond. Many cases are noted where the duration of pregnancy is out of proportion to the size of the uterus, and subsequent examinations demonstrate

that there is no increase in the size of the uterus. Later there is change in consistency, resembling a fibroid, and there may be constitutional effects.

There are two conditions to explain; 1. Death of the fetus, due to disturbance of maternal or fetal metabolism. This often occurs in well nourished women, and conversely, those suffering from marked organic disease go to term with well developed babies. The condition is sometimes repeated in the same individual and the authors suggest a possible relationship to the glands of internal secretion. 2. One must explain the retention of the dead fetus in the uterus. The authors believe that the rapidity with which the product of conception is thrown off, depends on the manner of death. They explain three types of abortion. 1. An acute sudden disturbance with, hemorrhage, pains, and uterine contractions, and prompt expulsion of the contents. The uterine surface of the placenta is displaced by bloodclot and separated. Expulsion is prompt and occurs before there is time for maceration. 2. A less acute process with discomfort or light pains, and irregular spotting extending over a period of two or three weeks. The condition may be controlled and the woman go to term, or hemorrhage occur, followed by expulsion of the contents. The placenta contains many small infarcts with necrosis, and the fetus is usually macerated. It is assumed that insidious changes occur at the placental site, but that the fetus is not thrown off till the process has become extensive. 3. A group of cases where the clinical course has not been studied but death of the fetus occurs due to changes in the cord and it is believed that the placental pathology is secondary. The process is slow in development, circulation continues for some time, and the product of conception does not become a foreign body till the placenta is completely disorganized. Expulsion of the uterine contents is delayed for a variable period and this condition is called a "Missed Abortion." The diagnosis may be confused with a myoma, though the history should be suggestive. Treatment is: dilation and curettage in the early cases, and induction of labor where the pregnancy has advanced eight weeks. Special care is necessary to avoid perforating a uterus which may be very friable.

ARCHIBALD L. McDONALD.

**SOME CHEMICAL STUDIES IN NORMAL AND ABNORMAL PREGNANCIES:** Killian and Sherwin, (Amer. Jour. of Ob. & Gyn., July 1921.) The authors' conclusions, briefly stated, are as follows: Normal pregnancy shows low values for nonprotein and urea nitrogen, the latter forming 44 per cent of the former. No change in uric acid, creatinine, chloride or sugar content of the blood as compared with the nonpregnant. A slight decrease in the combining power of the plasma shows in the last months of normal pregnancy.

In nephritic toxæmia the chemical blood changes are typical of impaired kidney function; nonprotein and urea nitrogen are increased, the latter forming 50 per cent. Emptying of the uterus affords but slight improvement.

Analogous changes are found in pernicious vomiting, postpartum eclampsia and eclampsia with gravid uterus; the nonprotein nitrogen is increased but the urea is decreased, being at the low normal limit. Definite increase in uric acid. A moderate or severe acidosis is observed in all cases. A prompt improvement follows in most instances after evacuation of the uterus.

ALBERT G. SCHULZE.

**THE BLOOD CHEMISTRY IN NORMAL AND ABNORMAL PREGNANCY:** Caldwell & Lyle, (Amer. Jour. of Ob. & Gyn., July 1921.) Their conclusions are as follows: In normal pregnancy, as compared to the nonpregnant, there is a low total nonprotein nitrogen, a low urea nitrogen and low ratio of the latter to the former. The nitrogenous constituents of maternal and fetal blood at end of labor are practically identical. A definite retention of uric acid at end of labor is found in abnormal cases only. Marked kidney insufficiency, as shown by high retention of nitrogenous waste products, warrants a very grave prognosis. High creatinine retention is given the same interpretation. Failure of the nitrogenous constituents to return to normal early in convalescence justifies a doubtful prognosis for subsequent pregnancies. A rapid return to normal justifies a good prognosis for subsequent pregnancies.

ALBERT G. SCHULZE.

**A CRITICAL ANALYSIS OF TWENTY-ONE YEARS' EXPERIENCE WITH CAESAREAN SECTION:** J. Whitridge Williams, (Bul. of The John Hopkins Hosp., June 1921.) The author gives a most instructive and masterly analysis from every viewpoint of 183 operations done upon 145 patients. His conclusions, briefly stated, are as follows: The material covers 21 years, up to December 31, 1920; it was furnished by approximately 20,000 deliveries, equally divided between black and white patients and comprise 104 single and 79 repeated operations. The ratio of operations in blacks and whites was 114 to 69 for the single and 30 to 11 for the repeaters.

The gross mortality was 5.46 per cent, the net mortality was 3.45, for the conservative operation it was 4.07 and for the Porro it was 1.82. The mortality was 13 times higher in the first fifty than in the last 133, due, not to any marked change in operative technique but rather to increased experience and early operation. All deaths but one were due to infection. The conservative section late in labor is always dangerous; Porro section relatively



safe. The best means of lowering mortality in the conservative section due to disproportion is by learning to determine before the onset of labor if operation will be required or not.

Disproportion due to contracted pelvis was the indication in nine-tenths of the blacks and in six-tenths of the whites. Various forms of rachitic pelvis in the blacks and simple flat pelvis in the whites were the predominant indications. Eclampsia and serious cardiac decompensation were the chief non-plevic indications.

Caesarean section is not the ideal treatment for eclampsia except in the presence of a rigid and undilated os and failure to improve with venesection. It is rarely indicated in placenta praevia; only one section in 66 cases in this series.

Generally speaking the patient should be sterilized at the third section either by amputating the uterus or sectioning the tubes. The author uses the low incision. The uterus should be incised *in situ* and viscerated only in the presence of infection. The latter procedure increases infection in normal cases. The uterus should be sutured in layers using the greatest care in the approximation of the peritoneal edges.

The uterine scar ruptured only once in 48 repeaters as well as in 12 spontaneous deliveries subsequent to section. "Once a Caesarean always a Caesarean" is not correct. On the other hand the possibility of rupture must always be faced and is the strongest argument against unnecessary section for non-pelvic conditions.

Insertion of the placenta on the anterior wall offers no objections. Only 7 per cent of babies were deeply asphyxiated. In spite of the value of pituitrin atony of the uterus must always be reckoned with and called for amputation of the uterus in two of the cases.

Uterine adhesions were absent in one quarter of the repeaters and were extensive in one-third of them. Not only infection but imperfect approximation and other traumatic factors are responsible for adhesions.

The operation is not without danger; it is safe under appropriate conditions and before the onset of labor. The author thinks the operation is abused; should be performed only when absolutely necessary and while it often offers the easiest manner of delivery it is not always the safest.

Only one case in thirty of contracted pelvis was sectioned.

ALBERT G. SCHULZE.

## ROENOLENTGOGY

### SUPERVISORS:

C. U. DESJARDINS,  
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R. G. ALLISON,  
SYNDICATE BLDG., MINNEAPOLIS.

### CONTRIBUTION TO THE KNOWLEDGE OF GENERAL HYPERPLASTIC PERIOSTITIS OF CHIDHOOD:

(Osteoarthropathie hypertrophique pneumonique Pierre Marie.) T. Heissen, (Fortsch. a. d. Gebiete d. Roentg. Band 28, Heft 3. p. 239, August 1921.) This condition was first described under the name of Osteoarthropathie hypertrophique pneumonique as a secondary hyperostosis of all the bones of the extremities in accession to a chronic pneumonic process and with contemporary joint changes. Experience has shown that other pathological conditions can occasion the same changes, the most important being chronic purulent processes, chronic intoxications especially lues and malignant tumors. Hyperostosis also occurs without demonstrable primary disease. The symptom complex has later been changes because of the lack in the majority of cases of joint changes.

The author reports the case of a 21 year old boy who, at the age of 4 years had a rib resection because of a left sided meta-pneumonic empyema. A small sinus has persisted during the 8 years. The clubbing of the fingers began one year after the operation and has progressively increased.

Roentgenologically there was an equal hyperostosis of all the phalanges of the hands and feet, the enlargement being in both the longitudinal and transverse direction. The bone structure itself was entirely normal and the enlargement was not due to an apposition of calcium as in ossifying periostitis but to a true ossal hypertrophy. Less pronounced were the changes in the carpal and tarsal bones. The distal end of the forearm and leg showed pronounced changes, most marked in the transverse diameter, while the diaphysis and proximal ends were little involved. The humerus and femur showed only slight changes in the transverse diameter of the condyles. The points showed no changes outside of the general enlargement of the bones. The skull thorax and pelvis were roentgenologically negative.

The authors case differs from other cases not only in the site of the enlargement but also in the lack of any periosteal proliferation. Freytag has described a case of club fingers in a 5 year old child where the enlargement was due entirely to swelling in the soft tissues. This enlargement disappeared with restitution to normal after curing the primary disease.

The author believes that the growing child behaves differently in this process than an adult in

that periosteal proliferation is absent and the change is a true ossal hypertrophy.

R. G. ALLISON.

**CONTRIBUTION CONCERNING THE ETIOLOGY OF THE SO-CALLED CASCADE STOMACH:** R. Stupel; (Fortsch. a. d. Gebiete d. Roentg. Band 28, Heft 3. p. 229, August 1921.) The cascade stomach because of its manner or origin as well as its behavior and appearance occupies a special place among the greatly different forms of hour glass stomach. This type of stomach is split up into two characteristically formed parts. The cardial part of the stomach with the gas bubble has a flat spherical shape, while the pyloric end is more pouch like. These two parts, which are connected by a bent narrow area, "the bridge," are so placed in relation to one another that the upper cardial sphere is situated posteriorly and dorsalward, the pyloric pouch inferiorly, anteriorly and medial.

During ingestion of a contrast meal one first sees the upper part fill to a certain level and then the meal rushes cascade like down into the pouch. In a true organic cascade stomach this filling phenomena and the form of the stomach remains constant during repeated examination.

The cause depends upon a raffing of the greater curvature by scaroor adhesion formation following an ulcer, perigastritis or a general peritonitis. Frequently cascade-like stomachs are seen which are caused by a gas filled splenic flexure of extra-gastric tumor, and these are only temporary findings.

The author reports such a case of accidental cascade stomach which was due to a tumor located between the stomach and spleen. After resolution of the tumor under x-ray therapy the stomach resumed its normal form.

The author reports two cases of true cascade stomach both of which were due to congenital defects. In the first there was a dislocation of the caecum and ascending colon into the left hypochondrium. In the second case there was an evntration of the right diaphragm with dislocation of the colon and liver.

R. G. ALLISON.

## PEDIATRICS

SUPERVISORS:

FREDERICK C. RODDA,  
CHILDREN'S CLINIC, MINNEAPOLIS.

ROY N. ANDREWS,  
MANKATO CLINIC, MANKATO.

**INDICANURIA IN THE NEW-BORN:** B. E. Bonar, (Amer. Jour. of Dis. of Child., April 1921.) Von Reuss found indican in the urine in breast fed children during the first nine days of life rather frequently, often without the observation of any clinical symptoms. He states that it occurs in the well nourished, in the undernourished, in the constipated, and in the diarrhoeic infants. It was rarely obtained on the first and second days, but most frequently found on the third and fourth day. The disproportion between the intensity of the indicanuria and the putrefactive manifestations in the stool was noted. The fact that Hecht was unable to recognize indol in the meconium suggests that indican may result from the breaking down of tissue protein. A complete urine examination was made whenever a positive indican reaction was found. All such examinations failed to reveal any pathologic findings.

Out of 338 specimens of urine tested, twenty-eight showed postive indican reactions. The reactions occurred most frequently and were more intense on the third, fourth and fifth days. No reactions were obtained on the eighth, ninth, eleventh, twelfth and fifteenth days. Of significance is the fact that indicanuria most frequently is obtained during that period of life when the transitory fever of the new-born, and the transition from meconium to milk stools occurs, when the weight has reached the lowest point.

There are probably two sources from which indican is derived. The first is decomposition of tissue protein and the second is putrefaction of protein in the bowel. Destruction of tissue protein to a considerable extent occurs during the first few days of life and particularly during the first five or six days of life. An initial loss of weight is common during the first five days, a larger portion of which is due to loss of body fluids but evidently some destruction of tissue protein takes place during this period when the infant receives insufficient nourishment. The presence of a relatively high amount of uric acid in the urine of the new-born brings forth further evidence of the possible destruction of tissue protein.

Decomposition of protein in the bowel is usually considered the chief source of indican in the urine. The findings of indicanuria in the new-born suggests two possibilities other than parenteral formation; that is, increased absorptive action of the bowel, and increased putrefaction in the bowel. Von Ruess speaks of the disproportion between the putrefactive manifestations in the bowel and the intensity of indican reaction. It is known that the bowel in its



entire length contains bacteria within twenty-four hours after birth. The possibility of putrefaction of intestinal contents is therefore apparent. The introduction of fluids into the gastro-intestinal tract supplies the moisture necessary for the growth of putrefactive bacteria. The transition of meconium to the milk stool is a gradual process taking several days. Thus it may be possible that during this transition to the milk stool there is an increased amount of putrefaction in the bowel.

R. N. ANDREWS.

#### USE OF INTRAMUSCULAR INJECTIONS OF CONVALESCENT SERUM IN SCARLET FEVER:

Paul Bode, (*Archiv. fur Kinder.* Vol. 69, No. 3, p. 258.) The author reports the results of treatment of 30 cases of scarlet fever all of which with the exception of 3 cases were of the severe toxic type with intramuscular injections of serum obtained from convalescent patients.

The donors were all above 12 years of age, free from tuberculosis and syphilis and in the 4th-6th week of their convalescence. The recovery in all cases had been uneventful with no complications. From 100-200 c. c. of blood was obtained, kept on ice until the serum separated which was then filtered, and 1/10 of its volume of 0.4 per cent phenol added. It was then kept on ice until used, this interval never exceeding two months.

He injected 40-100 c. c. of this serum, depending upon the severity of the symptoms and the size of the child, intramuscularly preferably into the gluteal muscles.

He reports very favorable results from this treatment. There was usually a very definite effect upon the temperature, which after a slight initial rise fell within a few hours in one of four ways viz: 1. By crisis. 2. By rapid lysis. 3. By a sharp remission. 4. By a remission followed by a more prolonged lysis. Crisis was not accompanied by any signs of collapse, but on the contrary by an improvement of the character of the pulse and other symptoms.

The effect on the general condition was even more striking. Patients previously delirious often fell into a sound sleep from which they awakened mentally clear. Others who had been in a deep stupor, often after 12 hours, sat up in bed and were rational. There was no appreciable effect upon the character of the eruption in the majority of the cases, and the desquamation was not affected.

His observations do not confirm those of Huber and Blumenthal that the sequellae are prevented by the use of the serum. He encountered them as frequently as would probably have otherwise been met in cases not treated with the serum. He believes that the complications are due to a secondary invasion of streptococci and that the serum is only effective against the unknown virus of scarlet fever itself. Possibly if used earlier it might be of greater value in this respect.

His investigations done independently but concurrently with those previously reported by others confirm in a general way the statements as to the beneficial effect of convalescent serum in this disease. He urges that it be used as early as possible and in sufficient dosage. The intramuscular route he believes to be equally as effective as the intravenous, and much simpler and less dangerous. The only reaction encountered was in a case in which serum, the donor of which had also received serum, was given. There were symptoms of collapse which soon passed over. Others have reported similar instances. In these cases the reaction was probably due to an anaphylotoxin in the serum of the donor.

M. D. OTT.

E. E. HUGHES, (*British Journal of Children's Diseases*, Vol. XVIII April-June 1921) reports a case of Empyema of the Maxillary Antrum in an infant of three weeks. The child had been delivered by instruments, and it was a vertex presentation. The condition had come on gradually probably having its origin at birth. There was swelling, redness and odema of the left cheek and the lower eye lid with a sense of fluctuation and egg-shell crackling over the centre of the superior maxilla. There was also a profuse left-sided nasal discharge, proptosis, slight epiphora, unilateral bulging of the palate and discharge of pus into the oral cavity through the upper alveolus on the left side. An incision was made into the upper alveolus with the evacuation of a large quantity of pus. Two unerupted teeth were accidentally removed. Daily irrigations brought complete recovery in three weeks.

E. F. ROBB.

#### TREATMENT WITH ADRENALIN OF SEVERE PULMONARY INFECTIONS IN INFANTS:

Joseph Vogl. (*Arch. fur Kinder.* Vol. 48, No. 3, p. 213.) The author reports his experience with the subcutaneous injection of adrenalin in infants ill with capillary pneumonia of tuberculous adenitis to avoid deformity and bronchitis and bronchopneumonia during the influenza epidemic of 1918. Sixty hospital patients with mortality of 6%, and 30 of 50 out patients were thus treated. Of the latter, the mortality was 13½% among those treated, as compared with 45% among those untreated. He injected 0.2 c.c. in small infants and 0.2 to 0.5 c.c. in older infants. From 3 to 8 injections were given daily depending upon the severity of the case. There was usually a rapid and marked decrease in the cyanosis and dyspnoea which attributes to a dilatation of the unaffected bronchi. He also believes that the vasoconstrictor action of adrenalin on the pulmonary vessels decreased the tendency to congestion and to exudation in the bronchi. If too large a dose be given, there is often vomiting and rarely a temporary state simulating collapse. The adrenalin was used in conjunction with the customary therapeutic measures employed in pneumonia.

M. D. OTT.

## BOOK REVIEWS

**THE WASSERMANN TEST.** Craig. Second Edition—1921 (C. V. Mosby Company, \$4.25).

This book especially in its enlarged and revised edition commends itself alike to the technical laboratory worker and to the general practitioner because of its comprehensive treatment of a most popular laboratory test for one of the most important and serious diseases of the present time.

The laboratory worker will find a detailed consideration of the Wassermann test from a technical point of view. The author's own method, a combination of the old Wassermann and the Noguchi technic, now used in all army laboratories, is given in detail. Other various modifications presented from time to time in the literature are also given with a frank discussion of their advantages and disadvantages.

The practicing physician will find a comprehensive history of the test and its interpretation as regards influencing factors, nature of the reaction itself, time of appearance in various stages of the disease and also its disappearance in the various stages. The specificity of the reaction, its value as an index of the prevalence of syphilis in communities and a control of the treatment of syphilis, is treated in a most able manner, augmented by a bibliography of 177 references to the literature on the subject.

The reaction in the spinal fluid also is discussed as well as the allied spinal fluid tests. The Colloidal gold is given especial prominence in a chapter containing a most complete and modern treatise of that subject.

Several points of especial interest well brought out by the author are. (1) One test is of little

value as even the strongest reactions if taken every day, will occasionally be temporarily negative. (2) A negative test following treatment frequently "relapses" to a positive in a few weeks or months, therefore necessitating frequent tests over long intervals before pronouncing a patient cured. (3) The injection of alcohol up to 24 hours before taking the blood for the test may change a positive to a negative reaction. (4) Certain bacteria in blood serum to be tested may give a false positive reaction. (5) Solutions of the *Treponema pallidum* while logically the best antigen proves to be in actual practice much inferior to the old alcoholic extracts of organs (heart or liver). (6) Ice box incubation of the simple alcoholic antigen is more delicate and will yield more positives than the incubator or water bath.

This second edition is a much more complete discussion of the subject than the first, occupying as it does, 4 additional pages and 39 additional references. It is a book well deserving of a place in the library of any physician practicing any specialty of the science of medicine.

MARGARET WARWICK.

**Compound of diseases of the Skin:** Jay Frank Schamberg, M. D. Price \$2.00. The purpose of a compend is to present information in a condensed form for the use of students. One may say that the present edition answers this purpose very well. It gives evidence of having been very carefully revised and contains some of the later methods of treatment. The chapter on the treatment of syphilis is to be commended.

E. C. GAGER.



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## ORIGINAL ARTICLES

### PAINFUL SCARS\*

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The purpose of this paper is to discuss the cause and the treatment of pain in scars when this is so severe as to result in a major disability. This paper will not discuss the discomfort in scars due to the fixation of attenuated blood vessels in connective tissue. Changes of weather cause these scars to give discomfort. Physiotherapy, hydrotherapy and various forms of heat and light seem to render the blood vessels in scar more elastic and less troublesome.

Most of the extremely painful healed wounds have been in amputation stumps. The cut nerve and its invariable subsequent neuroma has long been recognized as a cause of pain in amputation stumps. Various remedies have been sought. It was early learned the repeated cutting of the nerve did not bring relief. Often after repeated section of the nerves the patient, driven to the use of morphine to obtain relief of pain, became an addict.

Neuromata occur in many other localities and often give rise to puzzling pictures that are usually diagnosed as something else. A careful examination will usually disclose the character of the lesion; yet the diagnosis of painful neuroma is not often made outside of amputation stumps. Neuroma of an intercostal nerve in one case to my knowledge led to an exploration of the left upper abdomen.

Before considering the means of diagnosis and the remedy for neuromata a thorough understanding of the pathology is necessary. Every time a nerve is cut there will in time occur a sort of healing of the cut end. This healing manifests itself as a swollen round or more or less oval mass usually at the end of the cut.

This has been called a neuroma. We are told that they are not true neuromata but consist largely of scar tissue with some nerve fibrils. There may be variation in the proportion of these elements but it is of minor importance whether or not there is a large ball on the end of a nerve or a small one. In place of occurring at the end of a cut nerve, similar masses of connective tissue may occur anywhere in the course of a nerve provided that structure has been so traumatized as to interrupt some of the neuraxes. These fusiform swellings in the course of a nerve are referred to as central neuromata. As to the histological structure of neuromata the following facts may help to clear the subject. When a nerve is cut in part or totally, the neuraxes start to grow in a straight line if not interrupted. At the same time the growth of neuraxes starts there is coincident increases of the scar tissue. As a result there occurs an attempt on the part of the neuraxes to grow and this attempt is thwarted by the connective tissue. Then the neuraxes try to force their way. Not being able to do this they often twist themselves into spirals and corkscrew-like bodies. These were first described by Perroncito. The ordinary neuroma under the microscope shows more or less scar tissue and in this scar are numerous Perroncito fibrils. Some of these neuromata have caused pain, others have been only sensitive when pinched or struck. I have not been able as yet to differentiate histologically between the painful variety and the other. From clinical records I am of the opinion that the cause of pain is not in the histological structure of the neuroma itself but is due to extrinsic causes. By extrinsic causes is meant this: that every neuroma is potentially painful but it is only when they are irritated by the pulse wave of a contiguous artery or by a spicula of bone or by a strong muscle contraction

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or some other agent that they become actually painful. An alcohol injected nerve with no neuroma in one instance gave pain. The end of this neuroma was bound to the end of the cut humerus. The ordinary neuroma is painful because these delicate nerve fibers in the Perroncito fibrils are irritated.

Many devices have been tried to prevent the occurrence of neuromata. These include cutting the nerve with the cautery, with a sharp knife, tying ligatures about the nerves, and various plastic operations on nerves. None of these have proved satisfactory. On the other hand injection of alcohol into the nerve according to the method of Lewis and Huber seems to give results. The nerves so injected do not form bulbous neuromata but end as fine spindles or terminate abruptly. The alcohol seems to inhibit the down growth of the neuraxes and to lessen the increase of the scar to a neuroma.

The ligation of a blood vessel and a nerve en masse is a frequent cause of neuromata of peculiarly painful character. In case of F. this had been done and as a result he suffered with an intense neuralgia intensified by the pounding of the pulse. He had an amputation of the leg done for a gun shot injury three years before his last operation. Constant attacks of pain harassed him at night. These pains he described as being in the ankle and the front of the instep of the amputated limb. After doing a reamputation I dissected the specimen removed and I found the anterior tibial artery and anterior tibial nerve tied in a common mass. There was only a small sized neuroma. He, in fact, was disabled completely for three years but was relieved by reamputation and alcohol injection into the nerve trunk. The accidental occlusion of a nerve is especially apt to occur in abdominal work with the right rectus and Kocher incision. The pain these patients suffer is sometimes interpreted as due to adhesions. More especially are these cases deceiving in that if the nerve is simply irritated by the ligature and not cut we may have muscle spasm as a result and yet have no underlying inflammatory pathology. The same principle is illustrated in a patient upon whom a nephrectomy for multiple stones had been done.

This patient had been relieved of his kidney stones but suffered almost as much after the operation as before. He was suspected of malingering. Neurological examination showed disturbances of sensation along the course of the ilio-inguinal nerve. A second operation disclosed the fact that the nerve had been ligated with the accompanying artery. At the point of the ligation a lateral neuroma was found. Cutting the nerve relieved the pain and it did not return.

Another supposedly obscure abdominal case was that of A. M. This patient suffered from pain in the distribution of the eight dorsal nerve. There was no absolute anesthesia but a definite band of hyperesthesia and hyperalgia occurred corresponding to the neuralgic area. His history told that he had been shot in the chest and later had to have a tube in the plural cavity to drain the resulting empyema. Part of a rib had been trephined for the drainage tube. His pain developed soon after the drainage. On exploration we found a rough sharp end of the rib impinging on one of the intercostal nerves. When the nerve was dissected a central neuroma was found at the sharp point of bone. The bone was cut off squarely and about one inch of the nerve resected and the proximal segment was injected with alcohol. The pain was relieved and the patient had a narrow strip of anesthesia where he formerly had hyperesthesia.

One more case deserves especial mention. Miss M. had been operated upon for a benign tumor of the breast. Healing occurred but she suffered intense pain. A second operation was done but the pain persisted. Physical examination showed a wide scar on the region of the breast. In this scar tissue occurred a small hard mass that was extremely tender. On operation I found a neuroma. Alcohol injection resulted in a cure. In this case careful plastic work was done but in spite of the fact that tissues were approximated without tension the patient has a wide scar but a painless one.

In making a diagnosis of neuroma the following points have occurred again and again. The pain is almost always referred to some part or parts of the missing limb in amputation cases. In other cases the pain is referred to



the distribution of the involved nerve. If section is complete the area of cutaneous distribution will exhibit anesthesia. If the division is partial, then hyperesthesia and hyperalgia occur in about the same place. The neuroma itself is tender on pressure. Palpation sends sharp shocks of pain along the nerve course and we can feel the neuroma.

One of the greatest difficulties is to be sure that all of the neuromas have been found. A small cutaneous nerve may have developed in it a very painful neuroma. If other larger ones exist it may be difficult to determine upon the little ones. Not long ago I operated upon a patient who had a painful condition of the median nerve, on account of injury that resulted in the scar binding down that nerve. Neurolysis did not completely relieve the pain although anesthesia disappeared and motor function returned to the paralyzed muscles. On second operation I found a small neuroma in one of the cutaneous nerves of the region. Resection and alcohol relieved the pain. One learns to look for a neuroma in the large trunk but is apt to forget that there are endless branches of the cutaneous nerves and any one of them may be the seat of trouble. I will use another case to further illustrate this same point.

G. had been operated upon for neuroma. Enormous neuromata had been cut out in December 1920; in February they had recurred and I injected the three main trunks of the brachial plexus after cutting down upon them. No marked improvement occurred. His arm was so painful I could not make a satisfactory examination of it. So at the next operation I raised the skin from the entire stump and shoulder. I found five more neuromata that had not been injected. The nerves that had been injected did not show any neuromata but ended as fine spindles. The end result in this case will not be known for some time.

#### CONCLUSIONS

1. Surgeons should pay more attention to nerve supply and conserve nerves when possible.

2. Blood vessel ligatures should not include nerves.

3. In amputation cases or whenever a nerve

must be cut the proximal part of the nerve should be injected with alcohol with purpose of preventing a neuroma.

4. In all operations upon nerves associated with pain, watch must be kept for neuromata in small unimportant nerves.

5. Neurological examination may reveal nerve lesions in cases presenting themselves for reoperation for "adhesions."

6. After alcohol injection of a nerve the nerve stump should be so planned that it will not be subject to irritation.

#### DISCUSSION

DR. ARNOLD SCHWYZER, St. Paul: Whenever we have a paper from Dr. Corbett we always know it is something worth listening to. The doctor speaks of painful scars. We may have painful scars over the tibia or epicondyle. We may have adherent scars over exposed bone where we do not need to have this neuroma in a macroscopic sense. What he has given us here is present in these mentioned cases in a more microscopic form. He has mentioned the role that irritation plays. If we have an adherent or painful scar we feel that it is necessary to remove the adhesions. In making the incision it is better to cut these fine nerves, and in order to prevent adhesions we should do some sliding plastic operation.

He has spoken about neuroma, which is the most important formation that we have in painful scars. Neuroma, the—oma like in papilloma, carcinoma, fibroma, gives the impression that we have a neoplasm, but these formations are not neoplasms; they are inflammatory products. Although microscopically we may not be able to differentiate them if we do not know the history, they are inflammatory. How to deal with these irritations, whether they be an amputation neuroma or a neuroma due to some crushing of the nerve in its course, is the problem that confronts us.

I have handled a number of these cases, and I am not so enthusiastic about them as I used to be. When Dr. Corbett mentioned the subject this morning to me, two cases came to my mind that are rather interesting.

One case was a hernia operation that I had performed myself on a woman; an inguinal hernia; about fifteen years ago. The hernia was cured, but the patient came back some months afterward and complained of pain in the groin. I made up my mind that a nerve was caught in a silk suture. I feel sure that in grasping the external oblique fascia I had gotten hold of the ilio-inguinal nerve or one of its branches. I grabbed her skin to the side of the pubes as firmly as I could (she was a lean woman), and then I said to her, "I am going to hurt you now." What I did to her caused her to yell unreasonably. I pulled downward and inward suddenly and the

nerve that was caught was apparently torn. I have seen the lady quite often since and she has not had any recurrence of the pain.

In the other case the same treatment also helped. I happened to be out in the country in consultation and after seeing our case I was asked to see a lady nearby that had been operated upon and who had since had a lot of pain. She had had a perineorrhaphy; I don't remember whether she had anything else done. Following the perineorrhaphy she had excruciating pain for several months on one side of the perineum. The pain was pretty well localized. I knew that surgeon had caught the perineal nerve with his suture; there was no question about it. After giving sufficient explanation I took hold of these parts, and then, with the other hand assisting, I yanked that area over to the other side and forward, and relieved her trouble. I have not heard from that case, but I know the surgeon who operated very intimately and he would have told me if she were not well. These two cases were handled by evulsion. The question in my mind is whether, after excision of these neuromata we have recurrences.

DR. ARTHUR T. MANN, Minneapolis: I think the first lesson we learn here is that we should use alcohol in all amputations. There is no question that alcohol has been used before for the injection of various nerves for pain, and when properly used it always gives quite a long period of relief, so that we have that as a criterion. The injection of the nerve and the recovery of the nerve stump show that it does prevent in a large measure the growth of these axones, and the neuromas they form.

In connection with the question of amputation or section of the nerve, whether we have a neuroma to deal with or not, it is purely an academic question, and it comes to the definition of the term of what a neuroma is. There is no question at all about the tissue in these so-called neuromas. They are of scar tissue and of the axones. They look like skeins of yarn. They, of course, lead to a great deal of trouble when attached to scars. They cause a great deal of pain. If the scars are attached to bone, when the other parts pull the bone holds it and the pain is enormous. When attached to muscle, the muscles pull and the sensation of pain is transmitted to the nerve centers, so that our first lesson is always in amputations to use carefully injections of alcohol, to prevent the formation of neuromatous growths, and that means 95 per cent alcohol and it must be given inside the nerve sheath. This is absorbed in the sheaths of Schwann if it is thoroughly and slowly given, so that the alcohol will infiltrate all part of the nerve and will dissolve them. The old method of cutting the nerve off away back from the amputation stump still holds good.

There are other painful situations which have been gone over very carefully by Dr. Corbett. His paper is very thoroughly and carefully prepared. If you read the paper very carefully you will find the things

are all there and given in very simple language, and we can take our lesson from it.

In the soldiers who came back we found a great many of these neuromas. I have removed a large number and Dr. Corbett has taken out a large number. We have come to the conclusion from our experience that alcohol is our best application. A great many of these neuromas have recurred within six months or a year after they were taken out, and carefully taken out, without the alcohol, and I must say that I have had one recurrence after the injection of alcohol. We know in tic we get sometimes a recurrence of pain after a certain length of time after the injection of alcohol. Osmic acid has been used there as well as alcohol. We have not used osmic acid in these nerve tumors nor in the amputations. The latter gives longer relief in cases of tic where it has been used with the destruction of the nerve, but the alcohol certainly has served a very good purpose. As Dr. Corbett says, in at least 95 per cent of the cases we will get rid of the trouble.

In private life we have painful scars sometimes after any sort of operation, after an operation on the breast, after abdominal operations, and so on. We have pain in the legs and arms which is very difficult to diagnose. I have in mind one case that I saw last week. The patient is the wife of a millionaire. She has been babied a good deal; she has had pain in the leg for years, and she said the pain was so severe that she could hardly walk. She had an exceedingly good physician to take care of her. He searched for all focal infections and failed to find them. He searched locally for focal infection and failed to find it. She had a nurse with her for three months, and they were finally walking her two miles a day to get over this trouble which was undiagnosed, and it was thought to be functional of the hysterical order. One day, just as she was going up the steps, she fell, screaming with pain and said, "There it is, I can feel it." The nurse said to her, "Don't move," and the nurse got to the phone and telephoned for the doctor and it was found that what she had was a neuroma in the continuity of the nerve which had grown across the edge of the shin at the site of an injury. The neuroma was removed and the pain practically disappeared. However, she had some anesthesia down below, and she still has a little hyperesthesia. Alcohol should be used in this type of case too, at the time of the operation.

DR. J. C. MICHAEL, Minneapolis: I had occasion to examine a number of the cases Dr. Corbett has reported. From a neurological standpoint the symptoms are those of irritation of the sensory nerves. We find on examination hyperesthesia, hyperacute thermal sensibility, and increased pain sense, and also weakness of the muscles. Frequent trophic findings are hyperemia and hyperidrosis. The most important symptom is pain. The diagnosis should not be very difficult to make. There is, however a type of painful scar with which I am sure all surgeons



have become familiar in certain types of individuals. Some patients who get hit on the head or any part of the body may have pain at that location all the rest of their lives. Surgery done on this kind of individuals may be followed by localized pain, not, of course, of the same type as that from a neuroma, but less defined, less persistent type of condition constituting a neurosis. Here surgery should be looked upon as being the exciting cause just as we would look upon trauma as an exciting cause in the common case of traumatic neurosis.

I think Dr. Corbett's paper is of the greatest value to us, for the reason that he has pointed out not only the treatment of the neuromata as we find them but he has pointed out to the surgeon the method of prevention of neuroma formation.

DR. A. F. BRATRUD, Minneapolis: There is one type of scar we have seen that causes pain symptoms, but which the literature does not describe, and that is, where a person is hit in a very severe injury, a subcutaneous infiltration of the skin in some places of the scar. I have only seen one case, and I talked it over with Dr. H. E. Robertson. The scar in these cases is like a scar following a burn. There is pain under the scar. Dr. Robertson has had 7 cases of it, and in studying them he is of the opinion that it is a type of subcutaneous keloid. I am of the opinion that the keloid is in the skin only, but we were impressed with the fact that there was a subcutaneous keloid following injuries of the skin, particularly where there had been an abrasion of the skin.

Dr. Corbett hit the point exactly in one thing he said, namely, it is not a large nerve that produces the most trouble when associated with painful scars, but it is a small nerve.

DR. ROBERT EMMETT FARR, Minneapolis: It is a good thing for doctors to think of pain and the methods of relieving it. We pay too little attention to the question of pain and the suffering it causes our patients. It is perfectly natural that our patients should have some pain and they must go through it.

Dr. Corbett is entitled to great credit for calling our attention to such a definite method of preventing pain. I rise simply to mention two points, one the question of amplifying this method, which we have tried to do, where we have isolated them, with alcohol while we are doing any particular operation, especially a hernia operation. Authorities differ as to whether or not cutting the ilio-inguinal nerve and the ilio-hypogastric nerve will tend toward a recurrence of the hernia. I do not believe the injection of the nerve with alcohol will do so. We have made a perfectly painless post-operative course by this method. We have also used the method to prevent the various forms of paresthesia. I have injected 95 per cent solution of alcohol along the course of the nerve in cases of pruritus ani, and I find a small amount of alcohol will be tolerated.

With reference to these neuromata which occur in the stump in the upper arm or limb, I want to ask

Dr. Corbett whether it would not be possible to block the brachial plexus and not make reamputation. I scarcely ever see one of these cases, but the men who are doing federal work see so many of them that the idea has occurred to me that it might be possible to block the brachial plexus slowly with alcohol, and thus avoid making a secondary operation. Would it not be worth while to try that?

DR. J. FRANK CORBETT, Minneapolis, (closing): I want to thank the gentlemen for their discussions. In regard to amputations I happened to be in one of the large military hospitals where a large number of amputations were done. I managed to get through an order that all nerves in amputations were to be injected with alcohol, and the day that was done you could see a difference in the postoperative pain and in the comfort of the patients. They had no postoperative pain, and you could go through the wards and pick out those men by the way they felt. I have done the same thing in civil life, and the immediate results, freedom from postoperative pain and a good clean stump were attained.

The question Dr. Schwyzer brought up I think is an important one. From what he said, it must be possible to either loosen a nerve or avulse it and relieve the pain. I have not tried this; as it did not seem to me that good results would come from avulsion. In cases of avulsion of the nerves that I have been called upon to operate on I found large neuromata. The only case of cut nerve, where there was no neuroma, was in a man whose arm was partially cut off by a buzz-saw, and I found the ends of the musculo-spiral nerve in the same condition they were at the time they were cut, and I do not know but what we are justified in using a buzz-saw to cut off our nerves.

There is another type of painful wound that is not relieved. I remember at one time I cut down upon what I thought was a painful neuroma and much to my surprise the nerve popped up. It was so bright red in color it could be seen across the room, and there was no neuroma, and no interruption of that nerve. In other words, in that case, I was dealing with some rare form of neuritis that I could not at the time explain.

The question of blocking the brachial plexus is a good one. At this point (indicating on the black-board) in the upper arm we block the brachial plexus right above the clavicle. When you inject some alcohol in that place you have destroyed the sensation of every nerve that is below that point, but the sensation in the arm close to the body will not be interfered with. Therefore the sensation in a short arm stump will not be lost by injecting the brachial plexus at mid-point of the clavicle. Trophic changes occur if all the nerve supply is destroyed. In that case I believe it would have been a little more clever to have done as Dr. Farr suggested instead of taking each nerve individually.

In regard to blocking the ilio-inguinal nerve; Dr.

Muscovitz has done beautiful work on the ilio-inguinal nerve, particularly concerning the motor elements which supply the muscles concerned in hernia, and Dr. Farr is quite right in saying that it is an unsettled question whether destruction of the ilio-inguinal nerve will produce inguinal hernia or not. However, from the study that his man has made I am inclined to believe that sometimes destruction of the ilio-inguinal nerve may be followed by some motor paralysis that possibly might in some way influence the development of the hernia; but when we recollect the frequency with which hernia occurs in men of thirty-five years, (the percentage I think is something like five of all individuals) we must not jump at the conclusion that because we have some patients with a right rectus incision and cut ilio-inguinal nerve, that patient is going to develop a hernia.

I wish to thank you again for the discussion of my paper.

### SOME PRACTICAL EXPERIENCE WITH INJURIES WITH SPECIAL REFERENCE TO FRACTURES\*

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*Eveleth, Minn.*

Our work is such that we find it necessary to keep an account of every injury, however trivial, coming under our care whether at the hospital, office, or elsewhere. Records of this kind should furnish reasonably accurate statistics regarding the ratio of the various forms of injuries, that cannot be obtained from exclusive hospital or dispensary files.

In 1908, we reviewed 11,700 injuries occurring during the first fourteen years of our work at Eveleth and found that some part of the bony framework of the body was fractured 701 times or 6 per cent of the cases. There were 139 or 1.2 per cent dislocations; 195 puncture wounds of the feet caused by stepping on nails, etc. The head and face was injured 1,561 times, or 13.25 per cent; cerebral symptoms were observed in 39 or 2.5 per cent of these cases and there were 16, or about 1 per cent deaths, which includes every case that entered the hospital alive although the patient may have lived only a few minutes. Of the puncture wounds of the feet, 92 were on the right foot and 98 on the left, 5 not classified.

Our routine treatment in puncture wounds consisted of cleansing the skin, pushing a probe thinly covered with cotton and dipped in phenol to the bottom of the wound, followed by one dipped in alcohol, and applying a moist antiseptic dressing. In no instance was there an unfavorable result, although occasionally a mild cellulitis would develop which invariably subsided within a few days.

#### Table of dislocations (first series).

|   |    |
|---|----|
| Shoulder .....                          | 42 |
| Elbow .....                             | 16 |
| Wrist .....                             | 4  |
| Hip .....                               | 6  |
| Knee .....                              | 6  |
| Ankle .....                             | 14 |
| Patella .....                           | 1  |
| Miscellaneous, as fingers and toes..... | 37 |
| Clavicle .....                          | 9  |
| Vertebrae .....                         | 4  |

(Of the dislocations of the extremities, not including the fingers and toes, 57 occurred on the left side and 41 on the right side).

Of the 139 dislocations, 106 were closed, 4 compound, 27 closed dislocations with fractures, and two compound with fractures.

#### Table of Fractures (First Series).

|                 | Total | Closed | Open | Right | Left | Upper Ext. | Lower Ext. |
|-----------------|-------|--------|------|-------|------|------------|------------|
| Skull .....     | 41    | 14     | 27   | ...   | ...  | ...        | ...        |
| Face .....      | 42    | 25     | 17   | ...   | ...  | ...        | ...        |
| Extremities* .. | 596   | 494    | 102  | 324   | 252  | 297        | 299        |
| Trunk, as ribs  |       |        |      |       |      |            |            |
| spine, etc..... | 114   | ...    | ...  | ...   | ...  | ...        | ...        |
|                 | 793   |        |      |       |      |            |            |

(We have a memorandum of 92 additional fractures which were recorded before we commenced to keep a list of all injuries, making a total of 793.)

There were 494 closed fractures and 102 open fractures of the extremities, exclusive of crushing injuries of which there were 195. Of the crushing injuries, 148 occurred in the upper extremities and 47 in the lower. Fractures of the upper and lower extremities were almost equal in frequency, 297 and 299. Fractures occur in every conceivable form.

Since the above report was made we have reviewed 21,100 additional injuries to give these statistics. In this second series there were 1,334 or 6.32 per cent fractures, not including crushing injuries. Nearly all of these have been con-

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\*Side not specified in 20.



firmed by x-ray examination. There were 109 injuries diagnosed as possible or probable fractures not confirmed by x-ray and therefore not included in this report. In fact a radiographic

examination is made of every injury in which there is a possibility of fracture either from cause or symptoms.

(See Tables.)

CHART A

| Skull:                  | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 5        | 10 36      |
| Closed comminuted.....  | 1        | 1          |
| Compound .....          | 2        | 1 4        |
| Compound comminuted.... | 1        | 1 2        |
| Totals .....            | 7        | 13 43      |

(Of the above 5 were combined with other fractures.)

| Jaw:           | Side not |                 |
|----------------|----------|-----------------|
|                | Right    | Left Both given |
| Closed .....   | 5        | 2 1 2           |
| Compound ..... | 4        | - -             |
| Totals .....   | 5        | 6 1 2           |

(Of the above 4 were combined with other fractures.)

| Malar:         | Right Left |   |
|----------------|------------|---|
|                |            |   |
| Closed .....   | -          | 1 |
| Compound ..... | 1          | - |

Zygoma:  
Closed .....

Total Malar and Zygoma.... 1 2

(Of the above none were combined with other fractures)

| Nose:                   | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 21       |            |
| Closed Comminuted ..... | 1        |            |
| Compound .....          | 7        |            |
| Totals .....            | 29       |            |

(Of the above 4 were combined with other fractures)

TOTAL number of fractures of the head ..... 109

CHART D  
SUBDIVISIONS OF FRACTURES OF  
UPPER EXTREMITIES (Continued)

| Humerus:                | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 44       | 38 2       |
| Closed Comminuted ..... | 2        | 3 -        |
| Compound .....          | 1        | - -        |
| Compound Comminuted.... | 1        | 1 -        |
| Totals .....            | 48       | 42 2       |

(Of the above 20 were combined with other fractures)

| Hand:                   | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 23       | 16 3       |
| Closed Comminuted ..... | -        | 1 -        |
| Compound .....          | 2        | 5 -        |
| Compound Comminuted ..  | 1        | 1 -        |
| Totals .....            | 25       | 23 3       |

(Of the above 3 were combined with other fractures)

| Fingers:                | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 37       | 30 5       |
| Closed Comminuted ..... | 6        | 3 -        |
| Compound .....          | 26       | 21 4       |
| Compound Comminuted ..  | 6        | 2 -        |
| Totals .....            | 75       | 56 9       |

(Of the above 3 were combined with other fractures)

Unclassified ..... 6  
Total number of fractures of upper extremities ..... 532

CHART B  
SUBDIVISION OF FRACTURES OF THE  
TRUNK

| Scapula:                | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 9        | 7          |
| Closed Comminuted ..... | -        | 1          |
| Totals .....            | 9        | 8          |

(Of the above 8 were combined with other fractures)

| Clavicle:               | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 46       | 54         |
| Closed Comminuted ..... | 2        | 1          |
| Totals .....            | 48       | 55         |

(Of the above 7 were combined with other fractures)

| Ribs:                  | Side not |            |
|------------------------|----------|------------|
|                        | Right    | Left given |
| Closed .....           | 47       | 43 21      |
| Closed Comminuted..... | -        | 1 -        |
| Totals .....           | 47       | 44 21      |

(Of the above 8 were combined with other fractures)

| Spine:                  | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 8        |            |
| Closed Comminuted ..... | 1        |            |
| Totals .....            | 9        |            |

(Of the above 2 were combined with other fractures)

| Pelvis:      | Side not |            |
|--------------|----------|------------|
|              | Right    | Left given |
| Closed ..... | 8        |            |
| Total .....  | 8        |            |

(Of the above one was combined with other fractures)

TOTAL number of fractures of the trunk ..... 249

CHART C  
SUBDIVISION OF FRACTURES OF  
UPPER EXTREMITIES

| Ulna (alone):           | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 18       | 14         |
| Closed Comminuted ..... | 1        | 1          |
| Compound .....          | -        | -          |
| Compound Comminuted ..  | -        | 3          |
| Totals .....            | 19       | 18         |

(Of the above 10 were combined with other fractures)

| Radius (alone):         | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 32       | 31 3       |
| Closed Comminuted ..... | -        | 5 -        |
| Compound .....          | 1        | - -        |
| Compound Comminuted.... | -        | 1 -        |
| Colles .....            | 43       | 22 3       |
| Totals .....            | 76       | 59 6       |

(Of the above 8 were combined with other fractures)

| Radius & Ulna:          | Side not |            |
|-------------------------|----------|------------|
|                         | Right    | Left given |
| Closed .....            | 27       | 32 4       |
| Closed Comminuted ..... | -        | 1 -        |
| Compound .....          | -        | - -        |
| Compound Comminuted ..  | -        | 1 -        |
| Totals .....            | 27       | 34 4       |

(Of the above none were combined with other fractures.)

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 2        |            |
| Teens .... | 2        |            |
| 20's ..... | 6        |            |
| 30's ..... | 3        |            |
| 40's ..... | 3        |            |
| 50's ..... | 1        |            |
| ? .....    | 17       |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 46       |            |
| Teens .... | 17       |            |
| 20's ..... | 10       |            |
| 30's ..... | 10       |            |
| 40's ..... | 6        |            |
| 50's ..... | 7        |            |
| 60's ..... | 2        |            |
| ? .....    | 5        |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 1        |            |
| Teens .... | 3        |            |
| 20's ..... | 20       |            |
| 30's ..... | 26       |            |
| 40's ..... | 33       |            |
| 50's ..... | 18       |            |
| 60's ..... | 2        |            |
| 70's ..... | 2        |            |
| ? .....    | 7        |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 6        |            |
| 20's ..... | 2        |            |
| 40's ..... | 1        |            |
| 50's ..... | 1        |            |
| ? .....    | 9        |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 1        |            |
| 20's ..... | 5        |            |
| 30's ..... | 1        |            |
| 40's ..... | 1        |            |
| ? .....    | 8        |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 11       |            |
| Teens .... | 12       |            |
| 20's ..... | 4        |            |
| 30's ..... | 2        |            |
| 40's ..... | 1        |            |
| 50's ..... | 3        |            |
| 60's ..... | 1        |            |
| ? .....    | 3        |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 22       |            |
| Teens .... | 23       |            |
| 20's ..... | 19       |            |
| 30's ..... | 27       |            |
| 40's ..... | 24       |            |
| 50's ..... | 8        |            |
| 60's ..... | 4        |            |
| ? .....    | 8        |            |

| Ages:      | Side not |            |
|------------|----------|------------|
|            | Right    | Left given |
| To Ten.... | 32       |            |
| Teens .... | 21       |            |
| 20's ..... | 5        |            |
| 30's ..... | 4        |            |
| 40's ..... | 2        |            |
| ? .....    | 1        |            |

CHART E  
SUBDIVISIONS OF FRACTURES OF  
LOWER EXTREMITIES

|   | Side not |      |       | Ages:         |
|---|----------|------|-------|---------------|
|   | Right    | Left | given |               |
| Tibia (alone):                                      |          |      |       | To Ten... 28  |
| Closed .....  | 24       | 16   | 1     | Teens .... 12 |
| Closed Comminuted .....                             | 4        | 4    | -     | 20's ..... 15 |
| Compound .....                                      | -        | 1    | -     | 30's ..... 7  |
| Compound Comminuted ..                              | 4        | 4    | -     | 40's ..... 4  |
| Malleolus .....                                     | 5        | 5    | -     | 50's ..... 1  |
| Totals .....  | 37       | 30   | 1     | 60's ..... 1  |
| (Of the above 4 were combined with other fractures) |          |      |       | 68            |
| Fibula (alone):                                     |          |      |       | To Ten... 2   |
| Closed .....  | 20       | 21   | 1     | Teens .... 3  |
| Closed Comminuted .....                             | 3        | -    | -     | 20's ..... 13 |
| Compound .....                                      | 3        | -    | -     | 30's ..... 16 |
| Compound Comminuted ..                              | -        | -    | -     | 40's ..... 8  |
| Totals .....  | 26       | 21   | 1     | 50's ..... 2  |
| (Of the above 8 were combined with other fractures) |          |      |       | 60's ..... 1  |
|   |          |      |       | ? ..... 3     |
|   |          |      |       | 48            |
| Tibia & Fibula:                                     |          |      |       | To Ten... 5   |
| Closed .....  | 25       | 16   |       | Teens .... 6  |
| Closed Comminuted .....                             | 7        | 7    |       | 20's ..... 31 |
| Compound .....                                      | 4        | 5    |       | 30's ..... 27 |
| Compound Comminuted ..                              | 6        | 4    |       | 40's ..... 17 |
| Pott's .....  | 10       | 12   |       | 50's ..... 7  |
| Totals .....  | 52       | 44   |       | 60's ..... 2  |
| (Of the above 6 were combined with other fractures) |          |      |       | ? ..... 1     |
|   |          |      |       | 96            |

CHART F  
SUBDIVISIONS OF FRACTURES OF  
LOWER EXTREMITIES (Continued)

|  | Side not |      |       | Ages:         |
|--|----------|------|-------|---------------|
|  | Right    | Left | given |               |
| Femur:   |          |      |       | To Ten... 28  |
| Closed .....   | 23       | 18   | 2     | Teens .... 6  |
| Closed Comminuted .....                              | 2        | 3    | -     | 20's ..... 12 |
| Compound .....                                       | 2        | 1    | -     | 30's ..... 4  |
| Compound Comminuted ..                               | 1        | -    | -     | 40's ..... 7  |
| Trochanter .....                                     | 5        | 6    | -     | 50's ..... 2  |
| Totals .....   | 33       | 28   | 2     | 60's ..... 1  |
| (Of the above 8 were combined with other fractures)  |          |      |       | 70's ..... 1  |
|  |          |      |       | ? ..... 2     |
|  |          |      |       | 63            |
| Patella:   |          |      |       | 20's ..... 3  |
| Closed .....   | 4        | 2    |       | 30's ..... 2  |
| Closed Comminuted .....                              | 1        | -    |       | 40's ..... 2  |
| Totals .....   | 5        | 2    |       | 7             |
| (Of the above one was combined with other fractures) |          |      |       |               |
| Foot:  |          |      |       | To Ten... 2   |
| Closed .....   | 23       | 23   | 5     | Teens .... 8  |
| Closed Comminuted .....                              | 2        | 2    | -     | 20's ..... 50 |
| Compound .....                                       | 1        | 1    | -     | 30's ..... 49 |
| Compound Comminuted ..                               | 1        | 1    | -     | 40's ..... 26 |
| Totals .....   | 27       | 27   | 5     | 50's ..... 12 |
| (Of the above 8 were combined with other fractures)  |          |      |       | 60's ..... 3  |
|  |          |      |       | ? ..... 10    |
|  |          |      |       | 160           |
| Toes:  |          |      |       | To Ten... 2   |
| Closed .....   | 39       | 31   | 3     | Teens .... 8  |
| Closed Comminuted .....                              | 5        | 4    | -     | 20's ..... 50 |
| Compound .....                                       | 2        | 7    | 1     | 30's ..... 49 |
| Compound Comminuted ..                               | 6        | 3    | -     | 40's ..... 26 |
| Totals .....   | 52       | 45   | 4     | 50's ..... 12 |
| (Of the above 4 were combined with other fractures)  |          |      |       | 60's ..... 3  |
|  |          |      |       | ? ..... 10    |
|  |          |      |       | 160           |
| Unclassified .....                                   |          |      | 1     |               |
| Total number of fractures of lower extremities ..... |          |      | 443   |               |

CHART G  
SUMMARY OF FRACTURES

|                            | Fractures                 | Probable Fractures (1 fatal) |
|----------------------------|---------------------------|------------------------------|
| Head:                      |                           |                              |
| Skull .....                | 63 (30 fatal)             | 10                           |
| Nose .....                 | 29                        | 1                            |
| Jaw bones .....            | 14                        | 2                            |
| Malar Bones & Zygoma ..... | 3                         | 3                            |
| Totals .....               | 109                       | 16                           |
| Trunk:                     |                           |                              |
| Scapula .....              | 17                        | 2                            |
| Clavicle .....             | 103 (1 fatal c other inj) | 4                            |
| Ribs .....                 | 112 (2 fatal c other inj) | 25                           |
| Spine .....                | 9 (7 fatal)               | 0                            |
| Pelvis .....               | 8 (1 fatal—Embolism)      | 1                            |
| Totals .....               | 249                       | 32                           |
| Upper Extremities:         |                           |                              |
| Hand .....                 | 191                       | 15                           |
| Ulna (alone) .....         | 37                        | 15                           |
| Radius (alone) .....       | 141                       | 2                            |
| Radius & Ulna .....        | 65                        | 9                            |
| Humerus .....              | 92                        | 1                            |
| Unclassified .....         | 6                         | 3                            |
| Totals .....               | 532                       | 33                           |
| Lower Extremities:         |                           |                              |
| Foot .....                 | 160                       | 16                           |
| Tibia (alone) .....        | 68                        | 4                            |
| Fibula (alone) .....       | 48                        | 3                            |
| Tibia & Fibula .....       | 96 (3 fatal)              | -                            |
| Patella .....              | 7                         | -                            |
| Femur .....                | 65 (3 fatal)              | -                            |
| Unclassified .....         | 1 fatal c other inj)      | 7                            |
| Totals .....               | 443                       | 30                           |
| Recapitulations:           |                           |                              |
| Head .....                 | 109                       | 16                           |
| Trunk .....                | 249                       | 31                           |
| Upper Extremities ..       | 532                       | 33                           |
| Lower Extremities ..       | 443                       | 30                           |
| Totals .....               | 1333                      | 110                          |

44 per cent of clavicle.

44 per cent of femur.

41 per cent of tibia alone.

30 per cent of ulna alone.

Of the fourteen dislocations of the hip, eleven were on the left side and three on the right. All hip dislocations were readily reduced by manipulation under anesthetic, except one downward and inward in which manipulation was unsuccessful and I felt obliged to resort to the pulley.

The diagnosis of fractures may be easy, difficult, or sometimes impossible without the x-ray. Given a case with a history of injury by direct violence with tenderness on deep pressure at some point over the bone as the only evidence of injury, a split or crack in the bone is frequently found by making a number of x-ray exposures at different angles as emphasized by Dr L. E. Daugherty. (Fig. 1).

It may not be amiss here to mention an anatomical condition that is occasionally mistaken for a fracture. The shaft of the fibula can be only indefinitely palpated, except at its lowest

By referring to the tables, we find children ten years of age and under received:

51 per cent of all fractures of the humerus including elbow.

49 per cent of radius and ulna.





Fig. 1

fourth where it becomes subcutaneous. About four inches above the lower end of the fibula, there is a depression and just below it an apparent bony prominence suggesting a fracture with the upper end of the lower fragment riding outward. To add to the deception, continuous firm pressure in the depression causes pain. This condition can be demonstrated on almost any one, but it is more prominent in some than in others. An examination of the skeletal fibula does not fully account for the condition found on the living subject.

For many years the treatment of fractures has been neglected by our surgeons in civil practice. Of late there has been much written and said on this important subject, and it is interesting to watch the methods of fracture treatment.

My results in the treatment of fractures vary, of course, depending upon many circumstances. With a desire to improve them, I, optimistically at first and skeptically later, have tried some of the suggested methods with still varying success. My failures may have been due to faulty technique; but I am more convinced than ever that a sane and common-sense application of the laws of physics and mechanics is necessary, rather than the attempted use of some new device without a reasonable understanding of anatomy and what is required to secure good functional results; remembering that "Any variation in the pressure or change in the mode of transmission through a joint results in an alteration in the form of that joint."<sup>2</sup> And in the treatment of fractures extreme care must be taken to prevent

any variation in the normal anatomical relations of the articulating joint surfaces. As Dr. Jones concisely states: "Restoration of function is the all important thing", and the better the anatomical restoration, the better the functional result. "If we cannot always secure end to end apposition, there can be no difficulty even with the most primitive means in securing correct alignment in most cases."<sup>3</sup>

Fractures of the lower third of the bones of the leg are among the most difficult with which we have to contend; and in oblique or comminuted fractures of the tibia without fracture of the fibula, perfect alignment that will preserve the normal joint relationship can be seldom obtained without an open operation.

*Case I.* Louis A., age 37. July 29, 1918. Comminuted fracture of left tibia lower fourth. Perfect reduction impossible. Open operation refused. Union slow with some shortening of the tibia, which interfered with the normal relationship of ankle joint. Patient was in the hospital five months and twenty-five days. Total disability over two years. (Fig. 2. A. B. C. & D.)

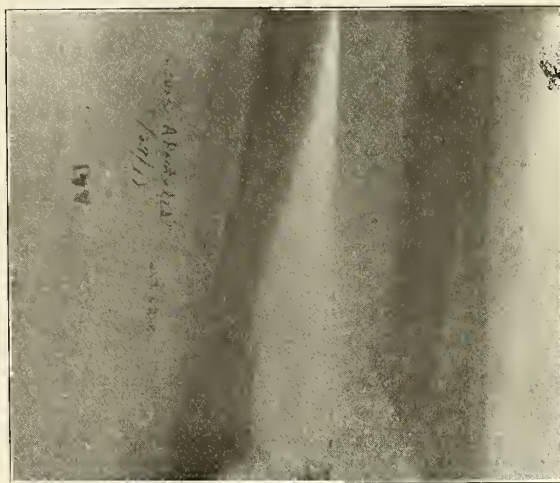


Fig. 2 A

Of course everyone who has much to do with fractures realizes the importance of bringing the foot up to right angle with the leg (unless there is some strong indication to the contrary) when it is necessary to encase the foot and leg in plaster of Paris. Failure to do so increases the disability from one to three months, that length of time usually being required before the joint regains its full motion.

Frequent inspection and comparison with the



Fig. 2 B

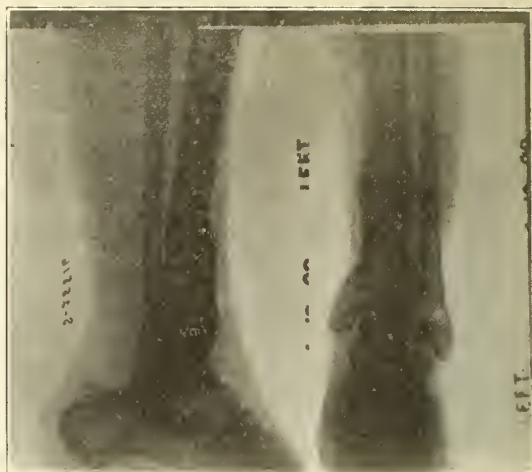


Fig. 2 D

sound limb is of much value and should not be neglected.

Thirty years ago I was taught to use the Hodgen's Extension suspension apparatus in fractures of the tibia and fibula, and have used it more or less ever since. My results from its use have been better than by any other method. It permits of extension, lateral traction and suspension in any position desired. It is comfortable for the patient and allows frequent inspection. So much has been written and said about the Hodgen that I hesitate to add anything further, but the following has proved of some value to me:

In oblique fractures of the tibia in which extension does not hold the laterally displaced fragments in position, I find that placing a strip of adhesive around the leg over the end of the displaced bone and attaching the ends of the

plaster to the opposite bar of the Hodgen, and placing another one around the leg on the opposite side and attaching it to the other bar produces lateral and counter-lateral traction. This together with complete extension holds the bones in position.

If one end is inclined to ride forward, a thick pad is placed over it and held down by a thin strip of board passed under each bar of the Hodgen, thus holding the fragments down firmly. The pad can be moved up and down daily as required to avoid pressure sores.

The Hodgen has many possibilities and it requires some knowledge of mechanics to get the full benefit of it. In fractures of the femur, we have used the Hodgen or double incline plane occasionally, and lately the Thomas hip splint; but more often in our earlier experience Buck's Extension with coaptation splints and a Hamilton long side splint, strictly in accordance with Hamilton's method. To prevent the foot and leg from rolling outward, one or two adhesive strips are placed over the bandage commencing at the inner side of the leg, passed under it and up on the outer side of the long side splint, drawn snug and fastened, thus holding the leg in good alignment. Boards are placed under the mattress if it is inclined to sag in the center. This is imperative.

Good functional results were obtained in the majority of cases; a few had permanent deformity; some were operated. This method is not adapted to all cases.

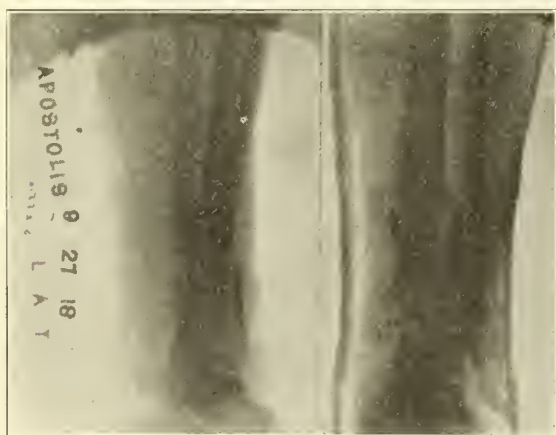


Fig. 2 C



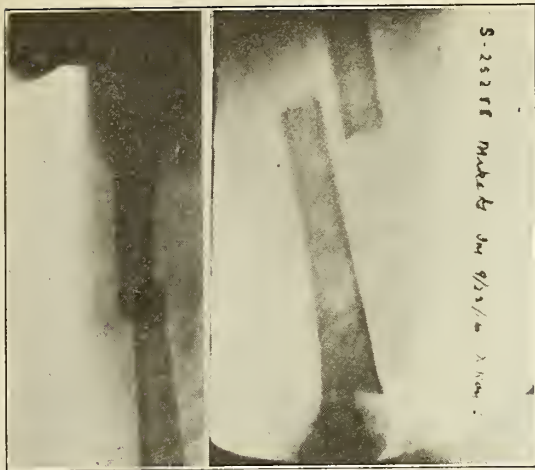


Fig. 3 A

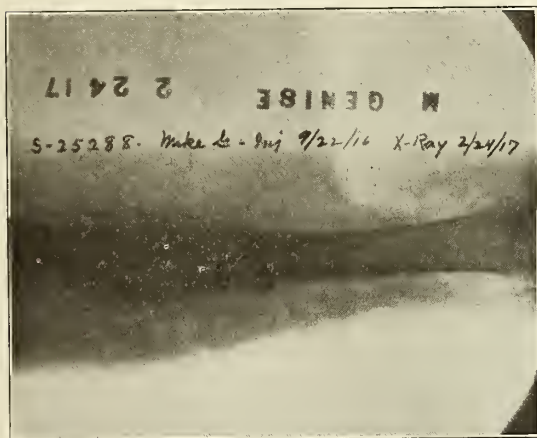


Fig. 3 B

After the x-ray came into use, we operated more frequently, using wire and, later, steel plates. Two wires were used, one passing antero-posteriorly and one laterally. The application of wires is a little more difficult than plates and perfect alignment is not so easily obtained but infection is less likely to follow the use of the former. Given a case where skillful attempts at reduction are unsuccessful, with proper surroundings, a surgeon with experience and technical knowledge, the consent of the patient, etc., we still have another important factor to consider—the patient's general condition.

*Case II.* Mike G. Sept. 22, 1916. This well developed lad aged eight years, received a transverse fracture of the shaft of right femur about the middle third with considerable displacement and 1.5 inch shortening. Under anesthetic an attempt was made to bring the fragments into apposition and the leg was dressed with Buck's extension by Hamilton method. The weight over the pulley was fifteen pounds.

The following day measurements and x-ray examination showed that the extension was nearly complete but the position of the fragments was little improved. The patient complained of pain in the fractured leg, was restless, and his temperature was 99 to 102 for about ten days. Three days later, thirteen days after the injury, the boy's general condition was apparently good and an open operation was done. The usual free incision was made and, as we were attempting to pull the fragments into place by means of bone forceps, free, moderately thick pus poured out from a pocket on the inner side of the leg. However, a four-screw plate was applied and two bronze aluminum wires passed around the plate and femur to hold the plate in place in case the screws became loose. Rubber drains were placed through stab wounds and the incision closed. On April 23, 1917, the condition of the leg was good with the exception of a discharging sinus. The plate and some fragments of dead bone were removed. He left the hospital May 13, 1917. The wound was closed. The result was very satisfactory—no shortening, good alignment and function. (Figs. 3, A & B).

We have been advised not to operate before seven to fourteen days after injury unless we can operate within the first few hours. If we had operated earlier and this infection had occurred (as it presumably would have occurred) we would have criticized ourselves for faulty technique. In this case, the pain and elevation of temperature for ten days were accounted for at the operation.

Microscopical examination of smears taken from the deeper parts of the wounds made in subsequent open operations for fractures have so far been without positive findings.

*Case III.* James F, age 30. Transverse fracture of the right femur about the middle third; shortening 1.75 inches; also a fracture of the inferior

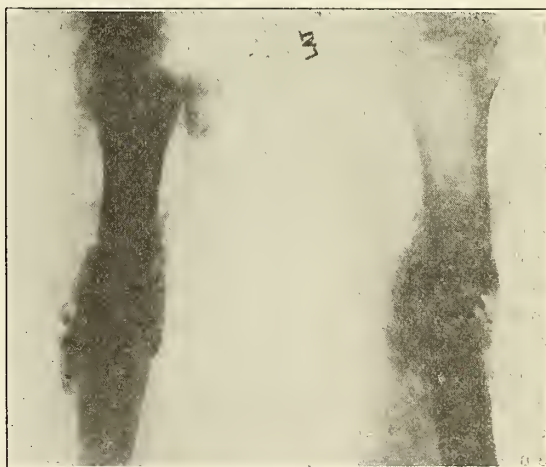


Fig. 4

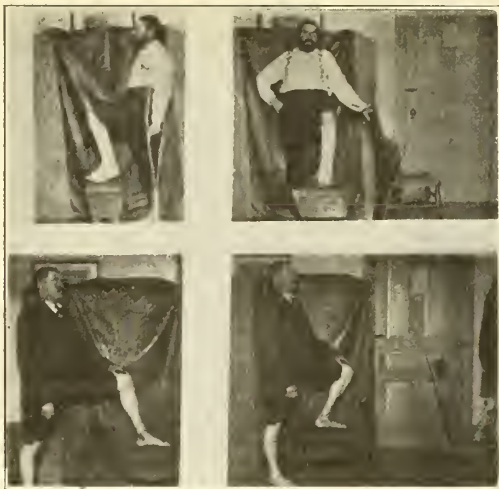


Fig. 6. A B C &amp; D

maxillary and crushing injury to all fingers of the left hand. The fingers were amputated; the jaw was placed in position and easily held by wires passed around the teeth; a Thomas hip splint was applied to the broken femur. Complete extension was accomplished, but the fragments could not be manipulated into position under anesthesia. A Lane plate was applied. A small projection of bone on the anterior surface of the lower fragment, which was resting behind the upper fragment, had penetrated the fascia, and it was with great difficulty that the bones were brought into correct position, the gloved fingers being inserted into the wound a number of times. Primary union had apparently taken place. Later the patient began running a temperature and pus was encountered. At the time of operation, there was an abscess of the soft parts around the fractured jaw. It is a question whether the infection in the femur was due to deficient asepsis or to the infection around the teeth, or to both. (Fig. 4.)

*Case IV.* John B, age 43. March 12, 1919. Patient was bowling and slipped on the floor. There was an oblique fracture extending from the lower posterior portion of the left trochanter downward and forward. Intoxicated; consumes large quantities of whiskey daily. General health good. The upper fragment was pulled well forward and could be easily felt beneath the skin and fat. Ether anesthesia produced violent clonism of all muscles of the body. Reduction impossible and April 4, 1919, open operation was done. The upper fragment was found to be pulled forward about three inches from the lower fragment and could not be pushed or pried backward sufficiently to be grasped in the jaws of the bone forceps. The gloved fingers were used to squeeze the bones partially together, while a wire was passed around them to hold them temporarily until a Parham band could be applied and a nail driven in. Primary union followed.



Fig. 7 A

June 7th the cast was removed. The patient was intractable and would bear considerable weight on the leg. On June 18th, he insisted on leaving the hospital and refused further treatment. The leg was 0.4 inches short. June 22nd, he was walking the streets using crutches, bearing considerable weight on the leg and had some stiffness of knee. A short time later he was walking without crutches.

Freshly mined iron ore and dirt deep underground is sterile. Crushing injuries and compound fractures occurring underground are seldom infected, but the treatment, of course, must be conducted with perfect asepsis.

In compound fractures where the bones are protruding through the skin the wound is protected by a wet antiseptic pad, and the leg is thoroughly washed and shaved. The left hand grasps the leg with the thumb and fingers on each side of the wound and by drawing and sliding the fingers toward the wound on the skin,



Fig. 7 B



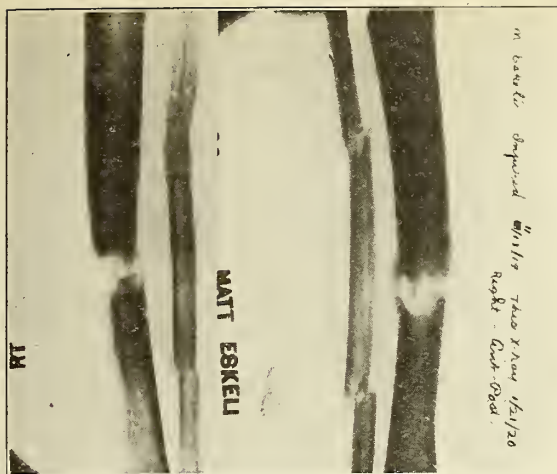


Fig. 7 C

clots of blood, dirt, etc., are squeezed out. The left hand is not released until the fingers of the right hand have grasped the leg in a similar manner and have been brought as close to the wound as possible, thus preventing any suction carrying possible infection into the deeper parts of the wound. This process is repeated until nothing further comes away. After which the fracture is reduced and the wound is dressed in the usual manner and in the majority of cases encased in plaster of Paris, with or without extension.

*Case V.* Anton M., age 58. June 11, 1898. Compound dislocation of right ankle, protrusion of the inner malleolus through a large open wound, and a comminuted fracture of right fibula. The patient was seen forty-five minutes after the accident. The leg was prepared as above described; the dislocation reduced; the wound partially closed and dressed with the foot inverted and held

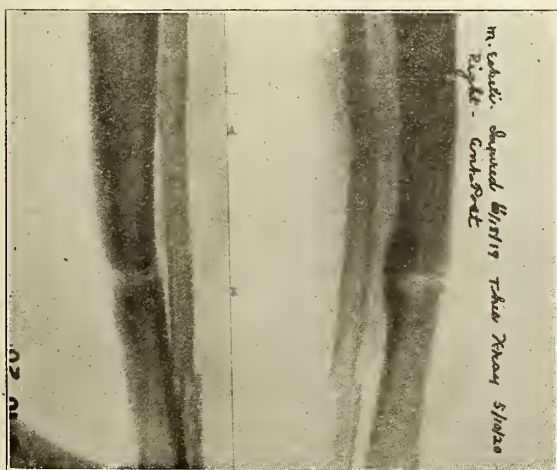


Fig. 7 D

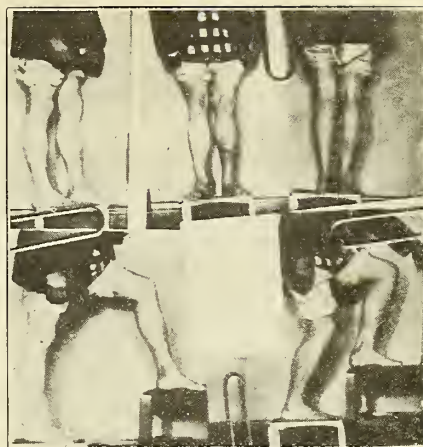


Fig. 7 E

at right angle to the leg; a plaster of paris cast was applied. The wound was dressed occasionally and a new cast applied each time, the leg being held in the same inverted position during the entire process. He was discharged July 30th. He walked without the aid of crutches or cane; had perfect motion in ankle; returned to work Aug. 21st, or two months and ten days after the injury. (Figs. 6, A, B, C, & D.)

*Case VI.* Matt E., age 49, farmer. Nov. 18, 1911, the automobile in which he was riding was struck by a railway passenger engine. He sustained fractures of the hand and shoulder, numerous cuts and bruises, a crushing injury to the soft parts of the right leg with a fracture of the tibia and multiple fractures of the fibula. The skin was intact, except an opening about one inch in diameter in the leg. This was plugged from the inside by torn muscle which prevented the escape of blood. The leg was very much distended. Amputation was considered and decided against. Without enlarging the wound, large quantities of blood, pieces of bone and torn muscle were squeezed out. The leg was dressed and a cast applied, so arranged as to permit frequent dressings. There was some discharge of serum, necrotic tissue, and pieces of bone from the wound; later some small pieces of necrosed bone, but there was no active infection. About Dec. 11th the leg was placed in Hodgen with extension, which was not permissible before. On April 21st, the patient was allowed to go home. By June 22nd the wound had nearly healed and he was walking without crutches, with good union and alignment. (Figs. 7, A. B. C. D. & E.)

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2. Arbutnot Lane, "Operative Treatment of Fractures."
3. Robert Jones, *Liverpool Medical & Surgical Journal*.

## DISCUSSION.

DR. DENNIS: I feel that we are very fortunate to have this paper by Dr. More. Perhaps very few men in the United States have had a wider experience along this line than Dr. More.

DR. L. E. DAUGHERTY: It was my privilege to be associated with Dr. More. The hospital which Dr. More has in Eveleth is small but the most completely equipped hospital that I have ever seen. The hospitals in St. Paul are not properly equipped to treat fractures. This is partly the fault of the surgeons who do not demand proper equipment.

These statistics of Dr. More's are very interesting and I know they are accurate. My own statistics in fractures are very poor in spite of my early training received from Dr. More and later from Dr. MacLaren. The Hodgen splint as used by Dr. More is extremely useful in fractures of the tibia and fibula. This was used during the war, but at the time Dr. Moore was using it 30 years ago I do not believe it was used for this purpose very much.

So many of the dislocations in these cases occurred in the left hip. I think I can explain this. Many of these miners work underground and many are injured by cave-ins. They work with the right foot extended and the left hip back, and when a cave-in occurs as they are thrown to the ground they give a twisting motion and fall to the left. This may account for the majority of dislocations in the left hip.

DR. H. B. SWEETSER: I would like to ask Dr. More, in injuries in that part of the country, what number of cases of tetanus he encounters. Here we would expect to get more or less cases of tetanus and use anti-tetanus serum.

A man was brought to us who had an un-united fracture of the femur. The x-ray showed overlapping bones and pieces of bone detached. Operated on 3 months afterward and found abscess surrounding the bone which the x-ray had not shown. Took out piece of bone and put the fracture in alignment. Put splint on and, with no drainage, wound healed absolutely perfectly. He had a firm union at end of 2 months.

DR. A. MACLAREN: The Academy of Medicine is very fortunate in having such a paper as Dr. More has presented, because there are very few men in the United States who have had such a wide experience with fractures as Dr. More has had. There are only a few surgeons in Dr. More's class. Dr. W. L. Estes of So. Bethlehem, Pa., who has most of the mining accidents of the Pennsylvania mine fields, and who has been Chairman of the Section on Fractures of the American Surgical Association for many years, is, I believe, the only man who has had as much experience as Dr. More.

Having served a long apprenticeship in the mechanical treatment of fractures Dr. More, who as I know is a very conservative surgeon, now reports quite a number of very interesting operations on fractures. What is the proportion of bad fractures which in his judgment should be operated upon? There has been

such an operative furor by surgeons of almost no experience that today the student thinks that almost every fracture should be operated upon. Our experience at the University Hospital is that of seeing many bad results following operations on fractures by men who never knew how to treat a fracture with splints.

DR. EMIL GEIST: I wish to thank Dr. More. I was very much impressed by the number of children involved and was beginning to wonder whether they had child labor up there. I am glad that the question of operative and non-operative treatment has been brought up. The question of metal plates and wiring is a moot question today and a good many have dropped that method. I think with the gradual removal from the surgical armamentarium of steel plates and screws our results will be better. I am glad that Dr. More reported Dr. Jones dictum that the better alignment we get the better functional results we are likely to get.

DR. ARCH A WILCOX: The subject of fractures necessarily always brings forth discussion. I have known of Dr. More's work for some time and shall look forward to the published tables and reports so that I may have a chance to study them.

The personal application of enthusiasm in the treatment of fractures tends to swing the pendulum towards conservative treatment in place of operative treatment.

I divide the responsibility in fractures into three classes: 1. the responsibility of the surgeon; 2. the responsibility of the hospital; and 3, the responsibility of the patient.

A patient wants to see his x-ray and I don't know how you are going to keep him from doing it. He may be distrustful and begin to argue about the treatment; he doesn't know much about function and alignment. I think certain propaganda should come from the profession for the purpose of changing the layman's point of view in this field.

In regard to the responsibility of the hospital, Dr. Daugherty took the words out of my mouth. Few hospitals are equipped for the treatment of fractures. A specialist in this line must have a workshop. In addition to this, space in the hospital should be given to a group of men who are particularly interested in fractures.

DR. MORE, Hibbing, (in closing): So many kind things have been said that I would feel highly flattered if I did not have my share of bad results in fracture cases staring me in the face. When Dr. Daugherty was associated with me his interest and enthusiasm in the treatment of fractures was a source of gratification, because I soon found I could leave the care of these cases to him.

Answering Dr. Sweetser's inquiry, I have never seen a case of tetanus on the range.

I have gone to Dr. McLaren with my problems on a number of occasions and have always been well advised; and I am sorry that I cannot tell him what proportion of bad fractures we have operated



upon. To operate upon the bad cases in which a reasonably good function cannot be expected by the closed method, and some of our worst results have been in these cases.

I appreciate Dr. Geist's suggestion regarding metal plates and wire. We have very little child labor on the range, and none for children under ten years of age to which my tables refer. The cause of fractures in children is principally from falls and automobiles.

Dr. Wilcox refers to the x-ray. It is our rule to show the patient his x-rays taken before and twenty-four hours after putting up the fracture, and all later x-rays. We take the patient fully into our confidence and tell him frankly and honestly what we think about it. He understands it better and seems more resigned if we tell him that a broken leg is a mended leg, etc. We use no camouflage. The only promise we make is that we will do the best we can; and we keep our promise.

In regard to tetanus, I don't think I ever was a case of tetanus on the Range. Dr. Daugherty overestimated my work in fractures and he took to fractures like a duck to water. We see constantly so many cases of fractures that we get tired of them. It is lots of responsibility. Eternal vigilance of fractures becomes tiresome.

I find the best way is to show the patient the x-ray and explain it to him and follow it right through. If we have to operate we show him why and explain that to him. Generally patients are better satisfied to be shown the x-ray plates and we get better results.

I have not looked up the proportion of cases in which we operate.

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## CYSTOCELE AND PROLAPSE\*

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The uterus and bladder are supported by an upper and a lower musculo-membranous plane or diaphragm. In the upper plane the uterus is supported laterally by the broad ligaments, posteriorly by the utero-sacral ligaments and anteriorly by the utero-pubic fascia plane which also supports the bladder. The spaces between the ligaments are filled by fibres passing from the uterus to the pelvic walls, thereby completing the upper diaphragm which is lined above by peritoneum and is perforated by the urethra, cervix and rectum.

The round, utero-sacral and lower portion of the broad ligaments contain a considerable amount of plain muscle together with strong connective tissue. This strong musculo-fibrous tissue in the lower portion of the broad ligaments is known as the perimetrium; it is a most important support for the uterus, vagina and bladder and maintains the pelvic organs in their relative positions. The lower plane or diaphragm may be divided into two diaphragms, the levator ani and the urogenital.

The levator ani with its rectovesical fascia above and its anal fascia below supplemented by the urogenital muscles in front and the coccygeus behind is the main supporting foundation which reinforces and supplements the upper diaphragm in retaining the pelvic organs at their proper levels. There are three openings through this lower musculo-fibrous plane:

1. The urethra which is well protected because it opens in front under the pubic arch.
2. The rectum behind which is well-protected because of the obliquity of its canal and the protection from its sphincter ani muscle.
3. The vaginal opening which is the weak point in this area.

Under normal conditions the vagina is also fairly well protected by virtue of its being placed well forward out of the line of direct pressure. The direction of the vaginal canal is such that intra-abdominal pressure tends to close the canal. When the uterus occupies its normal anterior position it serves as a cover for the upper end of the vagina; in addition the intra-abdominal pressure is received upon its broad posterior surface and distributed over a wide area of its supporting planes. As the intra-abdominal pressure pushes the uterus further down it closes tighter the vaginal canal and pushes the cervix further back, thereby putting the vaginal walls on a stretch, making protrusion still more difficult. When the uterus occupies its normal anterior position it may protect the vaginal opening even though the opening has been considerably enlarged and weakened.

The levator ani does not really elevate the anus. As its fibers practically surround the vagina and rectum, these openings are pulled

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forward toward the symphysis when the muscle contracts.

The levator ani muscle is really an abdominal wall muscle and contracts synchronously with the other abdominal wall muscles; if it did not, the perineum would bulge down when the diaphragm and other abdominal muscles contract, and the pelvic contents would be pushed out.

The anterior part of the pelvis is closed by the urogenital diaphragm which crosses at right angle to the levator ani and is anterior to it. It does not extend as far back as the rectum. Its function is to close the hiatus so that the organs will not be prolapsed during defecation.

If the abdominal cavity were filled with air, the pressure would be the same on all its walls, but as the abdominal cavity is filled with organs which have the same weight as water, we have hydrostatic pressure; therefore, when the body is in the erect position, the pressure is at the bottom and tends to push the pelvic organs out.

When the uterus is in anteversion, the line of pressure on the posterior surface of the uterus is deflected against the most resisting portion of the pelvic floor—the tendinous perineum. In retroversion the long axis of the uterus and vagina tend to coincide, in which condition the intra-abdominal pressure can more easily push the uterus out of the relaxed vaginal orifice.

The supports of the uterus are: peritoneum, arteries, veins, nerves, ligaments, fascia, pelvic floor muscles, fat and skin.

That the peritoneum cannot hold the uterus in position against the abdominal pressure is shown by hernias, where we have a fight between the peritoneum and abdominal pressure.

That the arteries, veins and nerves cannot hold the uterus in position is shown by a floating kidney, spleen and other loosened organs in which condition we have elongated arteries, veins and nerves.

The ligaments are the round, broad, utero-sacral and utero pubic. The round ligaments are curved, they are never straight, and are not normally tense. If a forcep is put on the cervix and the uterus is pulled down and out, the round ligaments will not become tense. They therefore cannot be suspensory ligaments and do not hold the uterus from prolapsing, but they do hold it in anteversion.

Alexander's operation will not cure prolapse, but it will cure retroversion if the pelvic floor muscles are intact.

The utero-sacral ligaments are also said to hold the uterus in position. They form part of Douglas' Pouch and become firm and tense when the uterus is pulled down. They are suspensory ligaments, containing muscle fibers which stretch from continuous pull. These ligaments help to hold the uterus in anteversion by pulling the cervix backward.

The muscle fibers of the round, utero-sacral, and broad ligaments and of the utero-pubic fascia, are of the same type as the uterine muscle and have the same innervation and act synchronously with it. During labor the uterus tends to go up into the abdominal cavity. Beside holding the uterus in anteversion, the main function of the round and utero-sacral ligaments is to hold the uterus down during labor contractions, being aided by intra-abdominal pressure.

The broad ligaments are composed of peritoneum, some plain connective tissue, muscle fibers, blood vessels, nerves and fat, all of which will gradually stretch under tension and are therefore usually not capable of preventing the uterus from prolapsing unless supported by the levator ani.

The utero-pubic fascia is often the first to give way, permitting the beginning of a cystocele, especially when the uterus is retroverted or the fascia has been damaged during childbirth.

There is still a controversy as to just what role the ligaments play in preventing prolapse. Although they do, no doubt, contribute to a considerable extent in supporting the pelvic organs, it seems quite reasonable to suppose that one of their main functions is to limit and accommodate the relative positions of the pelvic organs in their various functions so that as one fills or empties, the space it takes up may be compensated.

The perimetrium, by its firm attachment to the cervix and vagina holds the upper part of the vagina in place and keeps it from prolapsing. The uterus is a movable organ; it can be moved into anteversion or retroversion; it can be pushed up or pulled down. Under normal conditions, if the perineum is held back with a



retractor the cervix and upper part of the vagina can be easily pulled down to the vulva with a volsella even though there be no prolapse. The organs will return to their normal positions as soon as traction is relieved. We see patients with a marked cystocele with or without an elongated cervix and with a large patulous vaginal orifice, in whom there is no prolapse of the body of the uterus due to unusually strong broad and utero-sacral ligaments, or fibrous thickening and shortening of the pelvic connective tissue caused by pelvic infection.

With rare exceptions an enlargement of the vaginal aperture is a constant accompaniment of prolapse of whatever degree. A stretched vaginal orifice is occasionally seen without a prolapse; it is then frequently associated with bearing down pains and a sensation as if something was coming out. This is the warning that the unsupported uterine ligaments feel they are beginning to stretch and give away.

Prolapse does not take place when the uterine ligaments are normal and intact. When, as a result of childbirth, the lower supporting foundation or diaphragm is lacerated or stretched sufficiently to be thrown out of its normal relations the pelvic ligaments which have also undergone more or less stretching, are often unable to maintain the organs in their normal relations so that more or less prolapse takes place. Stretching or laceration of the vaginal aperture is therefore the greatest predisposing cause of prolapse and anything which increases the intra-abdominal pressure is an aid.

Prolapse occurring in nonparous women must be explained on the ground of disease or injury to the nerves supplying the muscles in either or both the upper and lower planes of pelvic supports, or to some congenital defect or atrophic disease of these supports.

In spinabifida or any other disease or injury of the third and fourth sacral nerves, the pelvic floor muscles are paralyzed, causing a bulging of the perineum in the male and a prolapse of the uterus in the female.

That cystocele is the most common form of prolapse to occur alone, is probably due to the fact that the utero-pubic fascial plane is thin and poorly developed; in addition it is unduly exposed to pressure during parturition because

of its position and firm attachment to the pubis. Moreover the base of the bladder lies close to and directly above the enlarged vaginal aperture and, therefore, sustains unaided the intra-abdominal pressure, often being deprived of the deflecting influence of the antverted uterus.

Often the stronger lateral and posterior ligaments may resist the downward descent of the uterus, in which case the cystocele, dragging on the cervix below its fixed point, may cause elongation of the cervix.

It is sometimes difficult to determine where the junction of the body and the cervix is, unless we remember that Tandler has called our attention to the fact that the uterine artery marks the separation of the cervix from the uterus. When there is a long cervix it must be amputated or it will worm its way through the smallest vaginal canal, acting as a leader for the uterus and bladder.

A uterus will not descend simply because the vagina is straight and has a wide outlet. It is not uncommon to see cases of badly torn perineum in hard working women with chronic coughs, abdominal tumors and high intra-abdominal pressure without a trace of prolapse. Women who have been torn right through into the rectum often do not have prolapse; they do not strain at stool and further they are possessed of tissues which tend to tear and not stretch.

The vast amount of discussion accorded uterovaginal prolapse during the last few years is convincing proof that there is as yet no general agreement as to the best method of operating; all are agreed however, that whatever method is chosen, thorough vaginal plastic work must be an essential accompaniment in order to insure permanent success.

The only operation which will close the hernial opening consists of approximating the borders of the levator ani muscle between the rectum and vagina. In order to get good results, it is essential that the levator ani muscle should be in a good healthy condition, as a weak atrophied muscle or connective tissue will stretch and give way. If the levator is deficient or atrophied, a piece of gluteus maximus about two inches wide may be detached at its anterior end, and attached to the periosteum of the

pubic arch, also attaching it to the sides of the rectum and vagina. The muscle fibers must not be loosened from their attachment to the coccyx and the sacrum, or their nerve supply will be interfered with.

No operation for the cure of cystocele or prolapse should be undertaken until all of the pros and cons have been thoroughly considered in order that the best type of operation may be selected for each individual case. In the cure of cystocele and prolapse we should not adapt patients to operations, but operations to patients.

There are a multitude of operations recommended for the cure of prolapse and cystocele.

In prolapse, the cervix, if long, should be amputated, after which the stretched lateral pedicles of musculo-fibrous tissue in the base of the broad ligaments should, when sufficiently elongated, be brought in front of the cervix and securely sutured with chrome catgut. The utero-pubic fascia and vaginal mucous membrane are then sutured in the median line. In order to secure good exposure and approximation the dissection must extend well into the lateral fornices, exposing the lower portion of the broad ligaments, and up on the uterus thereby thoroughly freeing the bladder.

Guided by the finger the sutures are passed into the lower portion of the broad ligaments below the blood vessels. With a little care the ureters will not be injured as they were pushed out of the way with the bladder when it was separated from the cervix and broad ligaments. The procedure will lift the cervix well up and push it back into the hollow of the sacrum, forming a long vagina and correcting any retroversion, after which the intra-abdominal pressure will keep the uterus in anteversion. In order to get better approximation and the greatest possible amount of shortening of the broad ligaments the cervix should be pushed up into the vagina before the sutures are tied. All sutures should be interrupted and those nearest the cervix should be tied first. As the lower pelvic diaphragm is a most important supporting foundation to the upper layer of supporting ligaments, it is most essential that the levator ani be securely sutured between the rectum and vagina. A Gilliam or Alexander operation with or with-

out shortening of the utero-sacral ligaments could be added to the above but is unnecessary if the levator ani and the tissue in the perimetrium are in a healthy condition and have a good nerve supply. This is a very satisfactory operation, leaving all of the organs in their normal relations, and does not interfere with child bearing. One should try to do the vaginal work so well that an abdominal operation will not be required. With increasing experience and a more thorough suturing of the perimetrium in front of the cervix, we have gradually extended this operation to more severe degrees of prolapse.

In complete prolapse occurring in a woman during the child bearing period, we do the same vaginal plastic work just described, in addition to which we open the abdomen and shorten the utero-sacral ligaments and do a Gilliam suspension.

In complete prolapse after the menopause, in prolapse with menorrhagia or metrorrhagia near the menopause, or in prolapse with disease of the uterus, the operation of choice should be a vaginal hysterectomy with suture of the broad ligaments; subsequent to this the bladder, utero-pubic fascia and vagina must be sutured to the broad ligaments, care being taken to approximate the lateral portions of the utero-pubic fascia before it is sutured to the broad ligaments. If the attachment is not made sufficiently close to the external urethral orifice, the bladder will not be reduced and the cystocele will persist after the uterus has been removed.

In cystocele without prolapse the operation of choice should consist of a thorough mobilization and elevation of the bladder with suture of the utero-pubic fascia or a dissection of the vaginal mucous membrane from the utero-pubic fascia and overlapping of the fascia as advocated by Rawls. In some patients the dissection of the mucous membrane from the utero-pubic fascia will be most difficult or the fascia will be greatly stretched or attenuated so as to be of little supporting value after dissection, in which case the undissected mucous membrane and utero-pubic fascia should be sutured in the median line after resecting the excess of tissue.



In the past we have performed many interposition operations with excellent results except in one case of procidentia in which the uterus prolapsed, fundus first, through the vaginal orifice with the bladder securely attached to its posterior surface regardless of the fact that the perineum had been carefully repaired. The patient was reoperated and the uterus securely fastened to the abdominal wall after having been bisected and each half sutured to the fascia of the rectus muscle according to the method of Dr. Murphy. This case caused us to discontinue using the interposition operation in complete prolapse especially when the uterus is small and atrophic and to adopt the operation of vaginal hysterectomy with low implantation of the united broad ligaments in the vagina under the bladder as the operation of choice in this type of case in women past the menopause. The only advantage which we can see that interposition has over vaginal hysterectomy is that the uterus, at this age a functionless organ, is left in the pelvis.

In our opinion the interposition operation gives the best results in cases of cystocele when the uterus is of approximately normal size and has been maintained at approximately its normal level in the pelvis of a woman past the menopause or who should for some good reason be sterilized.

Ventro-fixation should be used only as a measure of last resort because it is unanatomical and the uterus occasionally elongates and a cystocele may develop after the parts have been drawn up and the fundus is still securely fastened to the abdominal wall. Ventro-fixation is indicated when the condition of the tissues will not permit of the building up of a good firm perineum.

In conclusion wish to say:

1. The uterus is maintained at its normal level in the pelvis by its ligaments; because of the elasticity of these ligaments it has a considerable range of motion.

2. The pelvic diaphragm when in normal condition prevents the intra-abdominal pressure from stretching the supporting ligaments of the uterus.

3. That any operative procedure for the cure of prolapse or cystocele should aim to re-

store to as nearly a normal condition as possible the normal supports of the uterus and bladder.

4. That the alteration of the normal relationship of the pelvic organs or their fixation to the abdominal wall should be measures of last resort.

## DISCUSSION

DR. ARCHIBALD MACLAREN, St. Paul: I have never heard a paper that all the way through is so surgically sound as this one just presented by Dr. Earl. There is nothing to criticise, but I would like to reiterate some of the points made. In procidentia there are three mechanical problems which always arise, when we come to operate for this curious type of hernia. There is, first, the partial hernia of the child-bearing period, the most important because it is the first step in complete procidentia; this is corrected by perineorrhaphy. The old fashioned widely done operation, will cure all of these cases if taken early before the tissues have become relaxed and over stretched. When you come to the time of the menopause, you have a different, more difficult problem to deal with. You have the perineorrhaphy and other plastic operations on the vagina and the intra-abdominal and interposition operations, none of which would seem to be entirely satisfactory. We have tried them all; for a time all goes well, then we have a relapse, and the next time we try some other kind. Then there is the third type found among the aged women who have gotten through the normal use of the vagina,—the complete procidentia, with the small atropic uterus. In cases of this type the operation as described to me by Dr. Wheeler of St. Paul, is one that should prove very satisfactory. With local anesthesia you infiltrate a small area in the fourchette and then open through under the mucous membrane, and with an old-fashioned Peasley needle you go clear around the vulvar opening following the hymenial line bringing the needle out just underneath the urethra through the mucous membrane. Then putting a silver or bronze wire in through the eye of the needle and pulling it back out at the fourchette; reversing the process you go around the other side in here (indicating) and get the other end and bring it down and twist the wire down on the finger until it will just meet your finger; then cut it off and bury the ends. You can let the patient get up next day. This will hold the hernia just as a truss does, only in a more satisfactory way.

This seems to me to be an operation worth while, in these aged women and especially in women where other operations have been done. If the uterus has been removed and later the prolapse comes back, you have the most difficult problem that comes in this class of work. The uterus removed and the hernia returned. I have had to meet this problem more than once.

DR. WILLIAM A. COVENTRY, Duluth: Dr. Mac-

Laren's remarks about this being the best paper he has heard on prolapse of the uterus reminds me that about three years ago when I read a paper at the St. Paul or Minneapolis meeting he made the same remarks when he got up to discuss my paper. (Laughter.)

I have had one case in which the uterus had been removed, and the patient had a prolapse under the vault of the vagina that remained. I have not seen her since I operated on her a second time. She must be better or she would have returned.

The Murphy type of operation of splitting the uterus and bringing it up between the walls of the recti muscles I think is one of the poorest operations Murphy ever devised. Some of the results I have seen afterward in which part of the mucous membrane remained, and every month the patient has gone through a period of torture trying to take care of the swollen bisected uterus under the abdominal wall.

The point the doctor brings out with reference to stitching the parametrium in front of the cervix to elevate the cervix as high as possible in the vault of the vagina is the big trick of the operation of interposition. Whether you interpose the uterus or do a vaginal hysterectomy or interpose the layers of the broad ligament between the anterior vaginal wall and the bladder, I have found that if I passed these sutures and did not tie them, that is, use interrupted sutures and start to tie them after I fasten them, I can manage the thing much better. If you pass the first stitch through the parametrium and bring it out of the vaginal wall and parametrium and back again and tie it, the vault of the vagina is pulled up so (illustrating). If you pass the sutures first and tie them afterward, in my experience it works better.

I do not believe any intraabdominal operation for prolapse is worth much. The operation as done in my hands is one entirely vaginal, and I think it can be handled entirely through the vaginal route. The cure of cystocele without prolapse, especially after the menopause, I am quite sure is better done by the Watkins interposition operation. The operation to be performed for cystocele before the menopause or during the childbearing period is to go in and find the layers of the fascia to support the bladder. If you cannot find these, the chances are very much against you and you will have a recurrence.

DR. W. H. MAGIE, Duluth: I want to say a word in favor of the Murphy operation for suspending the uterus in a certain class of cases. I think there is a class of cases in which this is absolutely the best operation. This class of cases are those where the uterus is completely prolapsed and are usually in old women, who have passed the menopause. I witnessed Dr. Murphy make his second operation of this kind. Soon after, I had occasion to do the operation myself and the end results were very satisfactory. I have operated six cases by this method and

all have been satisfactory. If the operation is properly done and uterus fixed it cannot get away. The case that Dr. Coventry speaks of evidently was not a real Murphy operation. In the first place, Murphy did not advise the operation in women who have not yet passed the menopause; then Murphy recommended complete evisceration of the uterus. This was not done, evidently, in the case Dr. Coventry speaks of.

DR. A. E. BENJAMIN, Minneapolis: There is one sentence in Dr. Earl's paper which I think is the gist of the whole matter, and that is, selecting the operation to fit the case. There are many operations done for the relief of this trouble, and those who are somewhat inexperienced may select the wrong operation and get bad results, and if they do we must not attribute the results to the type of operation or add them to the statistics of the results for that type of operation.

It has been my practice to size up the lack of support in the individual case and to supply these supports in as natural a way as possible. I agree with Dr. Earl that we should correct the trouble before the menopause, if possible, but would say that, instead of doing technically a Gilliam operation, I would do a modified Gilliam, and bring the round ligaments out near the normal exit, over the fascia. Muscle does not support the ligaments very well unless you have some harder, firmer support to put stitches into, such as fascia.

With reference to the other operation for cystocele and rectocele near the menopause, I would agree with the essayist except to say that I have modified the Murphy operation according to a method which I have determined as being satisfactory both to the patient and to the surgeon.

Let me illustrate. (Illustrating on blackboard.) This roughly represents the uterus. Very often we have a diseased cervix which may be in the precancerous stage; therefore, we must get rid of the cervix. We will roughly draw the tubes here (indicating). It has been my habit to correct all of the defect below, the torn perineum and amputate the cervix by doing the ordinary Schroder operation; and then go ahead from above and do a laparotomy and completely remove the mucosa and all the body of the uterus excepting the outside and the tubes. We leave healthy ovaries in every instance. We turn the flaps over the fascia of the recti and there fasten them. This also pulls the bladder up. We must be sure, at first, in examining the case, that we can bring the uterus clear up to the abdominal wall. If we try to do the operation when we are not able to get the uterus up so as to touch the abdominal wall, a failure results. When the mucosa is completely removed and the flaps well secured the results are perfect. I have had some women complain of an oozing for a time from the abdominal wound. There is some discharge. We leave a little drain at this point (indicating) extending down to the remaining



portion of the uterus. Sometimes I have made the incision in the uterus transversely, taking the tubes out, and turning one flap forward over the fascia and the other flap upward. That method gives good results as well.

DR. ARTHUR T. MANN, Minneapolis: It seems to me, the foundation of this whole thing is a little better anatomical knowledge, and in my experience the men who have improved their results are those who have gradually acquired a knowledge of the tissues which support the uterus.

This question has been discussed for years; a good deal depends upon just what tissues support the uterus and what to do with those tissues. I think our troubles come before these bad grades of prolapse, however, and in my earlier surgical experience the point that interested me was that the pelvic floor was giving away; that is, the pelvic fascia and the fascia below the levator ani muscle, as well as that above, was giving away. We can prevent these mild grades of prolapse by studying to see whether the pelvic floor is giving away as well as the supports to the uterus above the pelvic floor. One can tell that by pulling the cervix down or bringing it forward and down by the finger. If the ordinary operation is to be done for a retroversion of the uterus, and most of these cases have a retroversion, with or without prolapse, the prolapse must be very distinctly looked for and determined before the operation is decided upon. If there is prolapse, it means stretching of the pelvic floor and stretching of the utero-sacral ligaments. These latter ligaments are difficult to find unless you know how to proceed to find them. When the abdomen is opened, if you put the finger behind the internal os, the utero-sacral ligaments will come out like two bands. I have seen them as strong as a good round ligament. If there is slight prolapse these should be shortened, and where you can get some of the fascia of the pelvic floor, it should be shortened with it. That holds it back.

A straight Gilliam operation which suspends the uterus by these little ligaments is not a good operation, in my opinion. If you take a swing and put the swing board under you and sit on it you will have tension on the ropes; they will have to carry your whole weight. On the other hand, if you put the board a little backward so that the swing board rests between the shoulders, it takes but a little tip to tip the body forward. This principle can be taken advantage of in work on the uterus. The weight should not be brought directly on the round ligaments. The round ligaments can be shortened in any way, but they should be shortened with this understanding, namely, if you can put them as you would a swing board between your shoulders, a little below your shoulders, you can swing yourself forward

with almost no tension on the ropes. After you have done that you must utilize the broad ligaments, and in a great many cases the broad ligaments should be brought to the uterus, shortened, and fastened to the uterus.

DR. WILLIAM F. BRAASCH, Rochester: I am not in a position to discuss the surgical procedures advocated by Dr. Earl in his excellent paper. I would like to speak of one feature of the surgical treatment for cystocele and prolapse and pelvic conditions in their relation to the bladder. I have observed young women, as well as older women, who have had previous operations for prolapse and for cystocele, even hysterectomy or panhysterectomy, because of bladder irritability. On cystoscopic examination of many of these patients we found definite cystitis, ulcers, infections of the kidney, tuberculosis, etc., to account for the vesical symptoms and which had been overlooked. The surgeon had evidently inferred that the bladder irritability was caused by the prolapse or by the cystocele without giving the urinary tract a thorough examination. It should be emphasized that these pelvic conditions rarely cause bladder irritability. In fact it is only in the exceptional case that the bladder is affected by any pelvic condition short of a malignant growth or pelvic infection which directly involves the walls of the bladder. I recall one or two cases in which there was residual urine in the bladder because of an extensive or extreme prolapse, but even with that condition other measures occasionally can be used rather than operation to remove the difficulty.

DR. ROBERT EARL, St. Paul, (closing): I wish to thank the members of the Association for their very generous discussion. In reply to Dr. Coventry's criticism of having difficulties with the menstrual fluid flowing into the subcutaneous tissue in cases in which the Murphy suspension operation had been performed, wish to say that this will not happen providing the Murphy technique is closely followed in which case the mucous membrane is entirely removed after the uterus has been bisected, or by using the technique suggested by Dr. Benjamin in which a V-shaped portion of the fundus and the mucous membrane are removed.

In my paper I called attention to the fact that in some women there is a great tendency to stretching of the tissues and in others there is a tendency to tearing. In the patients in whom there is a tendency to stretch, we can only secure good results by building up a good strong perineum. If the levator ani is in such condition that a good strong perineum cannot be obtained, then some type of suspension operation should be added. Of the various suspension operations I know of none which gives as good firm support as the so-called Murphy operation.

## SUBMUCOUS ULCER OF THE BLADDER AND ITS SURGICAL TREATMENT\*

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Most types of ulcers of the bladder until recently have been treated by means other than surgical. The advent of cystoscopy has placed many of these lesions on a definite etiologic basis, and has shown that most of them are infectious in origin, usually secondary to infection elsewhere in the urinary tract. Ulceration of the bladder of renal origin may vary from the slightest inflammatory change in the mucosa of the bladder to an ulcerative cystitis of the entire bladder. The common ulcerative cystitis is usually easily recognized and ordinarily can be placed on a definite etiologic basis.

The so-called "irritable bladder," that in the past has appeared to be negative on examination of the genito-urinary tract, has baffled urologists, and not until Hunner's first report (1914) of eight cases of "A rare type of bladder ulcer" was a definite pathologic basis presented to account for the symptoms in some cases. In subsequent papers Hunner has reported a total of twenty-five such cases. Since Hunner's first report approximately sixty-two similar cases have been reported in the literature; Hunner, twenty-five; Reed, five; Keene, ten (one of these cases was included in Hunner's series); Fowler, three; Kretschmer, five, and Bumpus, fifteen. The diagnosis was corroborated by operation in fifty-three cases.

Various terms have been used to designate the lesion; on the basis of its pathology we have chosen to call it submucous ulcer. It probably occurs more often than the number of reported cases would indicate.

Thirty-seven cases fulfilling all the requirements for the diagnosis of submucous ulcer of the bladder have been observed in the Mayo Clinic. In twenty cases operation was performed, and the diagnosis was corroborated. Bumpus reported fifteen of these. This report

is also confined to the cases in which operation was performed.

### ETIOLOGY

The etiology of the lesion has been obscure since its first recognition. Many possible causes have been suggested, but until recently none has been supported by evidence of proof. The low incidence in the male suggests some cause peculiar to the female. Most observers agree, however, that pregnancy, pelvic infections, pelvic operations, and so forth are not etiologic factors. Apparently they were not in our cases. Of the eighteen women in our series thirteen had had one or more pregnancies; four had never been pregnant. Two had had symptoms immediately following confinement, and one during pregnancy. Three of the women were single and presented no evidence of genito-urinary or pelvic infection. Frequency and bladder irritability at times follow pelvic operations, but while many of our patients had been operated on previously, only one patient dated the symptoms from a pelvic operation, suspension of the uterus. Because of the location of the lesion in the dome or lateral walls of the bladder and the absence of infection in the urinary tract most observers agree that it is not a urine-borne infection. Hunner has suggested the teeth, tonsils, and sinuses as possible foci of infection; others have also suggested remote foci, and the accumulating evidence supports the theory of a blood borne infection, placing the lesion on an etiologic basis with duodenal and gastric ulcers.

Rosenow's work on the selective affinity of organisms obtained from foci of infection suggested to Bumpus and Meisser a series of experiments which tend to show the selective affinity of certain strains of streptococci for the urinary bladder. Since in simple ulcers of the bladder and cystitis of unknown cause the urine contains the colon bacillus, this organism generally has been considered responsible. Bumpus and Meisser have shown, however, that pyelonephritis is often due to foci of infection harboring streptococci which have selective affinity for the urinary tract, and that the colon bacillus is of secondary importance. They report the results of the injections of thirty-three animals with cultures obtained from six pa-

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tients with submucous ulcer of the bladder. Sixteen of nineteen animals injected intravenously with primary cultures from the teeth or tonsils had lesions of the urinary tract; thirteen of these were in the urinary bladder. On second animal passage, injection of streptococci obtained from the lesions in the kidney and the urine of rabbits injected with the primary culture, produced lesions in the kidney in four of the five animals. In nine animals injected with cultures from the urine of the patients, lesions of the urinary tract occurred in six of seven in which the culture contained streptococci, and in neither of the two in which the culture contained only the colon bacillus. Bumpus and Meisser furthermore demonstrated diplococci within the submucous ulcer excised in two patients. The results of their investigation, it seems, justify their conclusion that submucous ulcer and other infections of the urinary bladder may be due to focal infections harboring streptococci which have a selective affinity for the urinary tract.

Since the teeth, tonsils, and sinuses are foci of infection common to the male and female, it seems that some additional etiologic factor other than focal infection must explain the frequency of the lesion in the female and its rarity in the male.

#### PATHOLOGY

The detailed pathology of submucous ulcer has been described by Hunner, Kretschmer, and others, and their agreement in the essentials of its pathology is assurance that the lesions in the cases reported are all of the type first described by Hunner. Suffice it to repeat that the ulcer develops as the result of chronic inflammation involving all coats of the bladder; it usually is surrounded by a variable amount of edema which may involve the major portion of the bladder dome and at times extend into the paravesical tissues. This, as the results of surgical treatment show, is of great importance in the surgical treatment of the lesion.

The ulcer is usually single, but may be multiple. It was single in most of the reported cases, and in only one of our surgical cases were there two ulcers. The lesion is found in the free portion of the bladder. In our series it occurred in the dome in thirteen cases, in

the posterior wall in three, in the left wall in two, and in the right wall in two. The ulcer itself is usually small. In our series it varied in diameter from 3 mm. to 2.5 cm.; in fourteen cases it was 1 cm. or more in diameter. While the true ulceration is small the edema and inflammatory reaction about the ulcer may be very extensive.

#### SYMPTOMS

The symptoms have been described by the various observers; those in the reported cases and in our cases are quite uniform: pain, frequency, and bladder irritability are present in all. The pain is not always confined to the bladder, but at times is referred to the perineum and rectum and often to the inguinal region on the same side as the ulcer. The irritability necessitates voiding every few minutes and is little alleviated by change in the reaction of the urine or by lavage of the bladder.

The lesion occurs most frequently in the middle decade of life. Our youngest patient, at the time of admission to the Clinic, was twenty-eight years of age, and the oldest fifty-six, an average of forty and seven-tenths years. The average duration of symptoms before admission to the Clinic was eight and seven-tenths years. The youngest age at the time of onset was nineteen years, the oldest forty-nine; the average was thirty-two. This average is somewhat higher than that in Hunner's series of twenty-five cases, in which it was twenty-five years. However, the average duration in his cases was thirteen years and the average age of the patients at the time of consultation thirty-eight years. The slight variations in these ages is of little consequence; the figures are important, however, since they show that the symptoms of this particular lesion are persistent for years, and that the lesion has been particularly resistant to all forms of treatment to which it has been subjected.

#### DIAGNOSIS

The diagnosis of submucous ulcer of the bladder is based on the history, urinalysis, and cystoscopic findings. Hunner states: "Given a patient who has had years of bladder misery in spite of many courses of treatment, who has clear urine macroscopically, free from infec-

tion, but containing blood cells and leukocytes, and cystoscopic examination reveals one or more ulcers, one is justified in making a diagnosis of this type of ulcer."

In our cases pain and frequency were the predominating symptoms, and they were present in all cases; tenesmus was associated in nine cases. Fourteen of the patients gave a history of hematuria, while examination of centrifuged urine showed no red blood cells in eleven cases, but in small numbers in nine. The examination of centrifuged urine in seven cases was entirely negative for microscopic elements. Pus cells were found in thirteen cases, but in none of these were they present in more than small numbers. Cystoscopic examination disclosed no evidence of cystitis or infection of the urinary tract, except the localized area of edema or inflammatory reaction about the ulcer.

#### TREATMENT

Patients with submucous ulcer of the bladder have been subjected, by virtue of the long duration of symptoms, to all types of treatment, including lavage of the bladder with various solutions, suprapubic drainage of the bladder, and fulguration of the lesion. Little more than slight or temporary amelioration has been accomplished in most instances. Previous to the recognition of the true cause of symptoms many patients were subjected to pelvic and abdominal operations without success. The cause of "irritable bladder" was not attacked directly by surgical methods until its recognition by Hunner. On the pathologic basis of this type of ulcer, that is, a chronic inflammatory process involving all coats of the bladder and usually surrounded by a variable area of edema, Hunner advocates wide excision of the ulcer and the edematous bladder wall. He attributes recurrence after resection to incomplete removal of the edematous bladder wall.

#### RESULTS OF SURGICAL TREATMENT

In view of the suggested etiology of submucous ulcer of the bladder and a review of our cases in an effort to ascertain the results of surgical excision of the ulcer, it seems that surgical treatment of the lesion is often insufficient for the complete eradication of the ulcer and the elimination of the possibility of recurrence.

The immediate results following wide excision of the entire thickness of the bladder wall and the surrounding inflammatory tissue were excellent in our series; practically all the patients were free of their symptoms or were markedly improved on leaving the hospital and on dismissal from the Clinic. The ultimate results, however, have not been so good. Seventeen of the twenty patients operated on have reported to us. Five are well and entirely free from bladder symptoms, two after three years since operation, one patient after two and one-half years, one after two years, and one after one year. Five patients report improvement since operation, one patient after three years, one after two years, one after nine months, and two patients after four months. Three patients report no improvement following operation; two after three years, and one patient after six months. Four patients experienced temporary complete relief, with subsequent recurrence of all symptoms, one patient after two years, two patients after one year, and one patient after six months. Cystoscopic examination of one of these patients after one year of relief disclosed a recurrence of the ulcer.

In all of the cases, except those of Keene, reported in the literature, that have been treated by surgical means, the immediate and not the late results have been stated. Five of the eight cases which Hunner first reported were treated by surgical excision of the ulcer. Not more than eight months had elapsed since operation in any case except that of his first patient, who had remained well for six years. The results in his Case 3 were good after two months, in Case 4 after six months, and in Case 8 after eight months. A recurrence of the symptoms took place in Case 5 two months after operation, which the author attributes to incomplete removal of all the edematous tissue about the ulcer. In a subsequent paper Hunner reports a recurrence of symptoms in Case 3 one and one-half years after operation, and evidence of recurrence of the ulcer on cystoscopic examination, recurrence of symptoms in Case 9 one year after operation, and in Case 12 one and one-half years after operation.

The time elapsing since operation in Keene's cases ranges from two months to two and one-



half years, with recurrence in Case 2 after seven months. The period since operation was two and one-half years in Case 1, two years in Case 2, twenty-three months in Case 3, twenty-one months in Case 4, sixteen months in Case 5, nine months in Case 6, three months in Case 7, and two months in Case 8.

Kretschmer's cases were all reported within six months of the operation, too short a time to ascertain the ultimate results. The same is true of Reed's three surgical cases.

It is obvious from the review of this series that the ultimate results of the surgical treatment of submucous ulcer cannot be accurately stated immediately after operation, for, while most recurrences result within a year, it seems that the possibility of recurrence cannot be eliminated within two years after operation. Even though permanent good results by surgical methods cannot be assured in all cases of submucous ulcer, the large number of cases in which complete relief, and those in which temporary relief or benefit is obtained from operation, make the surgical incision of this type of ulcer warranted in all cases. Hunner states, "No type of treatment suffices except wide excision of the inflammatory area." To this demand, in the light of the advances which have recently been made in establishing the cause of the lesion, should be added the elimination of removal of all foci of infection, particularly in the teeth, tonsils, and sinuses. The removal of such foci in conjunction with wide surgical removal of the ulcer should increase the percentage of permanent relief and decrease the number of recurrences.

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#### DISCUSSION

DR. GILBERT J. THOMAS, Minneapolis: I think any one of us who have had to treat cystitis which did not respond to treatment will appreciate the importance of this paper.

In 1915 I reviewed 250 cases of infection of the urinary tract in a paper presented before the Chicago meeting of the American Urological Society. I was able to find definite foci of infection at the time of examination in between 75 and 80 per cent of the patients studied. In the remaining 25 per cent the history indicated that infection had been present some place in the body with secondary invasion of the urinary tract.

Bacteriologic study revealed 60 per cent of the urines contained colon bacilli. We were impressed with the fact that the infection was the result of a more virulent organism than the colon group, probably some of the streptococcic group. We did not prove this bacteriologically at this time. Rosenow was just beginning his work on the selective affinity of organisms for certain tissues so that clinically we were of the opinion that the streptococcus, which is usually found in carious teeth, tonsils, and so on, was the offending organism in our urinary infections, and that it had some selective affinity for the urinary tract, but was not usually found when we cultured the urine. In addition to the teeth and tonsils, occasionally we found the gall-bladder and the appendix to be foci of infection, and in one case a chronic infection of the ear was the source of urinary involvement.

In my experience most cases of "Hunner" or "submucous ulcers of the bladder" are associated with pyelitis or pyelonephritis and are secondary to foci elsewhere in the body. Frequently, catheterized urine from the bladder or kidney will contain only an occasional pus cell, and probably none at all, but cultures will most often grow an abundance of colon bacilli and sometimes staphylococci. We have examined patients presenting a typical history and symptoms of submucous ulcer of the bladder, whose bladders have not shown the typical areola and ulcer. In these individuals we have been able to find pyelitis or pyelonephritis. Bimanually a definite pain area on palpation was found over the bladder.

In other words, it is my opinion that we do

have a sort of pre-ulcer stage in which localization of the infection has taken place in the bladder, but in which the typical picture, as seen with the cystoscope, is not prominent enough to enable us to make a diagnosis.

In addition to surgical removal, as Dr. Hunt has pointed out, we should be careful to remove all foci of infection. That means, of course, a complete and thorough examination not only of the head but of all other organs to be sure we are not overlooking some chronic focus.

Vaccines may be of some value in the pre-ulcer stage to prevent the formation of ulcer, and also in the treatment of those cases that have been operated upon. As Dr. Hunt has described, when the ulcer is present the only treatment then is surgical removal, but in order to prevent recurrences it is very essential first to remove all foci of infection. In addition it is possible we may be able to do something with a vaccine made from the offending streptococcus to prevent recurrences and to clear up any edematous areas which may have been left after the patient has been operated upon.

This subject is a new one and is very important. Up to the present time we have not fully appreciated the importance of this type of ulcer of the bladder. The first report which Hunner made called our attention to the cause in many cases of incurable cystitis in which up to this time no etiology could be found. Dr. Hunt's statistics of cures are not as brilliant as some that have been reported but his cases have been thoroughly worked out, and I think his opinion and statistics are of great value to the members of this Association. I wish to thank Dr. Hunt for the honor of discussing his paper.

DR. A. H. SCHWARTZ, Duluth: I would like to bring out one point in reference to these ulcers of the bladder, and that is the decision as to the time of operation. It has been my practice to wait some little period of time after the removal of the foci of infection, whether the foci of infection be the teeth, the sinuses or the tonsils.

I believe the reason that many of these ulcers of the bladder have not been benefited by operation, is that the protective wall which the infection has thrown around itself has been too quickly removed.

Possibly if we wait a longer time in these cases, they would get well without any operative procedure.

DR. WILLIAM F. BRAASCH, Rochester: I would like to make a few remarks endorsing what has been said by those who have taken part in the discussion. Ulcer of the bladder is frequently observed together with infections of the kidney, and as long as the renal infection is present it is futile to operate with a view to removing the ulcer. The high percentage of Dr. Hunner's success is due to the fact that in the patients whom he operated upon the infection of the bladder wall was localized. Doubtless a pyelo-

nephritis previously existed and was the original cause of vesical infection. The renal infection was the first to disappear and later the bladder infection cleared up with the exception of a localized area of infection which persisted in spite of bladder lavage. I believe if the surgeon waits until he has such a condition to deal with, his percentage of success will be greater. It is necessary, however, that the condition be localized to one area for if there are several areas in different parts of the bladder surgical treatment will not be so successful.

It should be emphasized that the removal of all foci of infection is essential to complete recovery. Patients with ulcers of the bladder are often observed to suffer with chills and fever and marked exacerbation of vesical irritation for a day or so following removal of infected teeth. With extraction of the teeth there is evidently a sudden influx of the infecting organisms into the system which lights up the old infection causing the exacerbation of symptoms. These patients should be conservatively treated at first with bladder lavage, topical applications, and removal of foci infection. Fulguration should also be tried since in some cases it has been beneficial. If none of these measures afford the necessary relief then surgical procedures should be instituted, but only when the process is localized.

DR. VERNE C. HUNT, Rochester (closing): We are all pretty much in agreement on the results of the experimental work performed in establishing, on a bacteriologic basis, the etiology of this type of lesion of the bladder. We may say that it is the first piece of work which places this lesion on a definite etiologic basis. This ulcer was not recognized for a long time. It produced a type of cystitis which in the past has been subjected to various kinds of treatment. I believe with Dr. Braasch that the employment of various types of treatment, such as bladder lavage, topical applications of silver nitrate, fulguration, and so forth, has accomplished much for these cases and will do more in the future if used in conjunction with the removal of foci of infection. As Dr. Braasch says, our patients should have the advantage of various types of treatment other than surgical in the light of results that have been obtained, and when these fail surgery should be resorted to.

Another thing I wish to mention is the determination of the results of surgical treatment or any form of treatment of this type of ulcer. The earlier reports lead us to believe that the ultimate results of surgical treatment of this type of lesion are excellent. But in a few months or a year or two recurrences are apt to occur. Patients should not be regarded free from symptoms for at least two years. In most as cured unless they remain so and are absolutely cases reported in the literature we cannot judge whether patients have been completely cured or relieved by operation.



## DUODENAL ULCER\*

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Duodenal ulcer is one of our commonest causes of indigestion. This paper, like most dealing with this subject, will contain considerable contrasting reference to ulceration above the usual limits ascribed to the duodenum. A rather complete study has been given to the literature, which when summarized furnishes data showing:

(1) The very definite value of surgery in the treatment of duodenal ulcer.

(2) The recognized failure of surgery to cure from twenty to forty per cent.

(3) The well known tendency to development of gastrojejunal ulcer for reasons not yet well understood.

(4) That most of the statistical data furnished that are reliable, backed up by satisfactory roentgen evidence, are from the surgeon.

(5) That the Anglo-American statistics clearly enough differentiate gastric and duodenal ulcer; give the roentgen evidence assisting in the establishment of diagnoses; and consider chiefly a chronic indurated ulcer as being surgical.

(6) In contrast to this, the continental statistics include considerable reference to post-mortem findings, but are not clear on differentiation between definite chronic, indurated ulcer and various erosions that might well be terminal events.

(7) Whether or not the more recent continental evidence accumulated since the routine use of roentgen methods might more nearly conform to the Anglo-American, certain it is that the defection of the war has undoubtedly been a factor in holding back their present opinions.

It is certain that but few statistics concerning the medical care of duodenal ulcer are at hand. More of these are needed, backed up by the same sort of evidence, particularly roent-

genological, upon which the surgeon is now determining in favor of surgery. As far as the medical regime is concerned, there will always be the lack of absolute confirmation which the surgeon has when he palpates the condition present. On the other hand, the properly trained roentgenologist has had his work checked over so freely by the surgeon that it is fair to assume that fully ninety per cent of his diagnoses are correct, taken together with the history of the patient and the other well known corroborative signs. In over two hundred cases of ulcer diagnosed by the roentgen ray, we have found the evidence trustworthy in all those cases which came to operation. Whatever limitations the roentgen ray may have, when it does make a diagnosis it not only gives the location but gives much evidence in regard to the type of ulcer (penetrating or callous), complications or impending complications, and upon these fundamentals the type of treatment should depend.

Proper medical statistics are further necessary because, despite the apparent unanimity of the surgeon and internist, often expressed in discussions and symposia before medical meetings and clinics, there is still a wide divergence of opinion, largely because each has seen the failures, but not the successes, of the other, and bias is bound to develop. Much is yet to be learned from unbiased observers. This is admirably illustrated by Eggleston<sup>1</sup> in his study of the records of the cases of gastric and duodenal ulcer at Battle Creek, Michigan. Some of the results of his review were surprising to me, and it is one of the prominent features that stimulated me to review our own records. In reviewing more than sixty articles published since 1912, dealing with ulcer and its treatment, there are only two writers who discuss the medical aspects of the disease, presenting statistical data on the results of treatment, from which the reader could properly draw conclusions in keeping with those presented by the surgeon. In fact, much of our knowledge of ulcer and its incidence can be attributed absolutely to the conviction of the surgeon who demonstrated the "living pathology," and thereby justified his disdain for the abdominal wall.

\*Presented before the annual meeting of the Minnesota State Medical Association, Duluth, Aug. 25, 1921.

## SURGICAL STATISTICS AND THEIR MORTALITY

In judging any surgeon's mortality statistics, it would be only fair to know the type of patient being referred to him. This means that in a clinic where most patients are given medical treatment by preference, he will only get the severe cases; his mortality will be correspondingly high. Contrarywise, the clinic in which the weight of opinion is surgical will get patients who are better surgical risks. Surgeons of the very highest repute have commented on this, usually where they have been in association with strong minded internists.

Balfour<sup>2</sup> reviews 2,875 duodenal ulcers, with a mortality of 1.6 per cent.

Coffey<sup>3</sup> operated on 233 ulcers, with a mortality of 4.33 per cent.

Deaver<sup>4</sup>, from 1909 to 1915, operated on 179 duodenal ulcers, with a mortality of 3.35 per cent.

Finney and Friedenwald<sup>5</sup> report a group of 100 cases operated on by Finney's pyloroplasty, with a 5 per cent mortality, and 93.6 per cent cured or with satisfactory results.

Hohlbaum<sup>6</sup> gives a mortality rate of 11 per cent on 46 non-perforating ulcers which received surgical treatment, but only 18 patients were finally symptom free.

Lemon<sup>7</sup> states that 81 per cent of the patients operated on at the Mayo Clinic are considered cured, and an additional 10 per cent improved.

Moynihan<sup>8</sup> reports 187 cases of duodenal ulcer, with a mortality of 2.4 per cent, and 79 per cent cured.

Petren<sup>9</sup> gives his results on 283 cases of non-perforating gastric and duodenal ulcers operated on since 1896 at various Swedish hospitals. The mortality rate was 6 per cent in a series operated on from 1904 to 1908. Fifty-two per cent remained cured; 21 per cent were improved; 27 per cent have had serious gastric trouble since the operation.

Troell<sup>10</sup> reports on 234 surgically treated ulcers, with a mortality of 8.5 per cent previous to 1916, and since then a mortality of 6 per cent. The end result after a period of from one to nine years is 70 per cent alive and fully recovered or improved. Twelve per cent had to submit to a subsequent operation, and 3.5 per cent had died of gastric disease.

The foregoing data are considered representative of the surgical talent at home and abroad, and from these data we conclude that the number of patients cured by operative procedure is from 52 to 81 per cent, and the immediate mortality from 2 to 11 per cent. In other words, a patient with a duodenal ulcer, submitting to operation, stands about one chance in twenty-five of dying, and less than three chances out of four of obtaining a cure.

## CONSIDERATION OF THE RELATIVE COMPLICATIONS OF GASTRIC AND DUODENAL ULCER

There has been an increasing tendency against recommending medical treatment for ulcers of the stomach except in selected cases. The basis upon which this contention is grounded deserves the most careful consideration:

(1) Ten to twenty per cent of gastric ulcers are penetrating in type. These ulcers are apt to invade vital organs, sometimes doing irreparable damage. It is generally agreed, however, that the decisive roentgen evidence, including a niche, may disappear under a medical regime.

(2) Gastric ulcer tends to produce definite deformities of the stomach, not easily corrected by later surgical procedure, and when so corrected may leave poorly functioning stomachs. Therefore, earlier surgery would have given better results. Perforation and hemorrhage will be considered in contrasting similar complications of duodenal ulcer.

(3) The greatest weight has been given to possible malignant development on an ulcer base. This is neither the time nor place to enter into a full discussion upon the precancerous possibilities of chronic gastric ulcer. Nevertheless, the evidence so far presented to justify the contention that chronic irritation in the stomach, as elsewhere, may lead to malignancy, deserves unusual study. The clinical evidence has long been against the contention that ordinary carcinoma in the stomach arose on ordinary ulcer. There is some clinical evidence to substantiate the pathological contention that gastric ulcers may become malignant. I followed one roentgenologically proved ulcer, which responded therapeutically and favorably for a year, and then developed surgically proved carcinoma at the site of the ulcer. The



location was high up on the lesser curvature—too high for resection as a cancer—but probably operable in its ulcer stage. Observations such as this should be most carefully recorded, because the pathological evidence alone is insufficient, as presently offered, to throw so decisively the indications for the treatment of gastric ulcer to the surgical side.

MacCarty<sup>11</sup>, before the annual meeting of the American Roentgen Ray Society in 1920, gave the data upon which he decided that two chronic, indurated ulcers, macroscopically alike, should in the one case be classified malignant and the other not. This is a momentous differentiation, and if correct can manifestly only be made by a pathologist studying the tissues, as MacCarty states, immediately after removal. It concerns such technical features as the study of properly made frozen sections under the oil immersion lens, with attention particularly to the characteristics of the individual cells, the size of its nucleus, the presence or absence of nucleoli, in addition to the usual consideration of penetration of these cells into the fixed tissues. MacCarty states, "These cells themselves are morphologically indistinguishable from cells which are definitely known to be carcinomatous."

In the present stage of our knowledge, are we justified in relying on this evidence alone for the making of this momentous decision? Can the ultimate gross tissue process be judged entirely on the individual character of its cell components? This represents a new pathological conception, and the full, complete answer is not yet forthcoming.

Fortunately, in dealing with duodenal ulcer, there is no such division of opinion on the possibilities of malignant implantation. Here we see more clearly what our attitude might be toward the medical or surgical treatment of ulcer were malignancy not a possibility. Here we see more clearly the need of closely scrutinizing the pathological data and findings in gastric ulcer as above intimated.

#### FURTHER SPECIAL CONSIDERATIONS OF DUODENAL ULCER

(1) It is rarely of the penetrating type, and less commonly involves the pancreas.

(2) Severe deformity of the cap rarely pro-

duces any thing more serious than pyloric obstruction, the surgical treatment of which has produced the most brilliant surgical results. It has been the complication increasing most strikingly surgical cure. Eusterman<sup>12</sup> states that 95 per cent of these cases with advanced pyloric stenosis are permanently cured.

(3) Perforation of a duodenal ulcer is probably more common than perforation of gastric ulcer, but is less serious. Gruber<sup>13</sup> states that perforation occurred in 17 per cent of duodenal ulcers, as against 5.6 per cent of gastric ulcers. Alexander<sup>14</sup>, in a study of 157 cases of ulcer treated at the Episcopal Hospital, Philadelphia, found that 22 per cent had acute perforation. Hospital and surgical statistics, of course, do not reveal the true incidence between duodenal ulcer and acute perforation, because all acute abdominal cases are very likely to reach the hospital and come to the attention of the surgeon. Mayo<sup>15</sup> states that acute perforation in ulcer of the stomach is less common than in ulcer of the duodenum, but in the former there is less likelihood of the ulcer being protected by adhesions. The gastric capacity is large, so that considerable contents may escape. Since the contents are relatively much less sterile than in the duodenum, there is a greater chance of perforation producing septic peritonitis. He also adds that ulcer of the stomach is a more serious condition than ulcer of the duodenum, but fortunately less frequent. The mortality rate of acute perforation treated surgically is given by different writers as follows:

Farr<sup>16</sup> reports 24 operations for perforating ulcer, with 3 deaths.

Gaird<sup>17</sup>, in a collective review of a series of 200 cases of perforating ulcer treated in Edinburgh between 1896 and 1912 by a number of different Edinburgh surgeons, found that in 145 cases operated on between 1908 and 1912 there were 94 recoveries and 51 deaths, approximately 65 per cent recovering. In 116 cases operated on within the first 12 hours after the onset of symptoms, there were 75 per cent who recovered.

Gibson<sup>18</sup> reports 14 operations for perforating ulcer, with 1 death.

In this clinic we have operated upon 7 perforations in the past four years, with no deaths.

In our own experience only 8 acute perforations have been observed, representing about 2 per cent of all ulcer cases seen. Considering the frequency with which duodenal ulcer is now diagnosed, I feel that our figures are worthy of consideration as representing approximately the incidence of perforation in ulcer cases. If 75 per cent of these can be saved, the fear of acute perforation should not be great.

(4) Hemorrhage occurs with about the same frequency in gastric ulcer as duodenal ulcer.

Balfour<sup>2</sup>, in a series of 2875 duodenal ulcers operated on, found that 20 per cent gave a history of hemorrhage, and that 12.7 per cent still had hemorrhages after a gastroenterostomy.

Gruber<sup>13</sup>, in a report of 140 cases of ulcer found at autopsy, gives hemorrhage as a cause of death in 4.4 per cent, as against 3.6 per cent in gastric ulcer.

While such figures are, in a measure, discouraging, I am forced to believe from our own experience, together with that of others, particularly Eggleston's<sup>1</sup>, that fatal hemorrhage in duodenal ulcer is extremely rare.

(5) Postoperative complications or unsatisfactory physiological perversions after gastroenterostomy, and notably gastrojejunal ulcer, are an unfortunate sequela of fully 20 per cent of duodenal ulcers operated upon. This must stand at the present time as a distinct deterrent to surgical treatment.

*If the foregoing comparison of the complications of gastric and duodenal ulcer is correct, duodenal ulcer must be considered a relatively benign disease, and carrying far less danger to its host than gastric ulcer.*

#### DATA ON 104 CASES OF DUODENAL ULCER

This review deals with 104 cases of duodenal ulcer, in which the diagnosis was confirmed by the roentgen ray. In order that at least two years should have elapsed since they were first seen, none was included that occurred after Jan. 1, 1919.

Eleven had had symptoms less than three months, and four less than one month. It shows that a considerable number of duodenal ulcers are being diagnosed at a relatively early age, and often in their first attack. It must be frankly admitted that the decisive evidence

upon which this early diagnosis was made came through the routine use of the roentgen ray. In fact, the roentgen evidence is going to change greatly our conception of the age incidence of this disease. Eleven, or 10 per cent, showed some degree of retention by the barium meal, but only three had a marked retention. Five gave a history of hemorrhage. Forty of the 104 cases were operated upon, with an immediate mortality of 6.1 per cent. Sixty per cent reported themselves free from symptoms since the operation, 28 per cent improved, and 12 per cent unimproved.

The remaining 64 patients were treated medically or not at all. Eight cases had hospital treatment, 6 of them remaining well, and 2 having recurrences. There were 46 cases which had what we term "ambulatory" treatment. This consists in the giving of five or six feedings of a diet consisting chiefly of carbohydrates, with alkalies between feedings, and the patient is permitted to continue his usual activities. Thirty of these patients have been heard from. The length of time they staid on the diet varied from 3 weeks to 2 years. Eleven of these 30 patients have reported no return of symptoms for more than 2 years. Seven report remissions, but consider themselves improved. Three are unimproved. It is rather startling that 36 per cent of these patients should have remained well on a treatment so simple. It is further strikingly evident, strongly supported by the recent literature, that the fundamentals involved in the proper medical treatment of duodenal ulcer are relatively simple.

Wright<sup>19</sup>, through an intensive study over several years of the dispensary material at the University of Minnesota, came to exactly the same conclusions.

#### CONCLUSIONS

(1) A little more than one-half of duodenal ulcers in this series treated by gastroenterostomy got complete relief. The relief was absolute; they are free from any digestive disturbance, and usually eat what they please. Twenty-five per cent were benefited, and 12 per cent not improved.

(2) Thirty-five per cent in this series of uncomplicated duodenal ulcers responded to rather simple dietary restrictions and alkalies, at



least insofar as remaining symptom free for a reasonable period of time is concerned.

(3) At the present stage of our knowledge, the fear of possible malignancy arising on gastric ulcer must still be a large determining factor in the choice of surgical treatment; but, the situation deserves the most intensive study.

(4) Considering the fact that duodenal ulcer is exceedingly common and relatively benign, and many people go through life with this ailment without treatment and without much inconvenience, it seems entirely reasonable that all cases not presenting definite and well known surgical complications, should be given the benefit of medical treatment. This must remain true despite the remarkable surgical results of treatment in properly selected cases. The successes enumerated, from 50 per cent to 80 per cent, variously estimated, still leave 20 to 50 per cent whose only remaining hope is further questionable surgery, or medical treatment. Would it not be advisable to try medical treatment first?

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#### DISCUSSION

DR. CHARLES B. WRIGHT, Minneapolis: Dr. Martin has asked me to say a few words on our experience at the University in the treatment of a certain type of ulcer cases—the ambulatory type.

First, we must properly classify ulcers. I think it is a great mistake to treat some types medically, and just as great mistakes are made in treating other types surgically. I think we have now reached the place where we can differentiate very well. We have had large experience in treating the simple acute ulcer without definite complication. These cases come complaining of pain, fear of eating and the various things that go with it. In handling these cases we are constantly dealing with patients who refused hospital care, because they had dependents and were not ill enough to go to bed. We thought best to treat them more or less by the ambulatory method rather than not at all, and we were much astonished to find that a large percentage were entirely relieved, and remained well over a period of three or four years on our very simple regulation. So we do not hesitate to treat a case that has no complications. On the other hand, we do not attempt to treat ulcers that show retention or vomiting or any evidence of perforation or hemorrhage.

Smith has laid emphasis on one great essential in treating ulcer, that is, the removal of evident foci of infection. You will not cure by removal of the focus, but you are much more liable to prevent recurrence. I think this is a very important thing.

As to the other phases of the ulcer question, I am sure that I can add nothing to what Dr. Martin has said in his valuable paper.

DR. H. K. SCHAAF, Minneapolis: I enjoyed Dr. Martin's paper immensely because it differed from the average paper on the subject. Usually we hear the enthusiastic report of the internist or the sur-

geon advocating his own methods of treatment and giving no consideration to the other side. I do not know of a medical subject where we have more differences of opinion concerning medical or surgical treatment than in hyperthyroidism and ulcer, and there is no reason for it, because there are definite indications for either method of treatment. The trouble is that we have been misled by statistics. Many of us do not seem to realize that there is a great difference in the material seen by the general practitioner, the internist and the surgeon. We know that there are certain cases of gastric ulcer that do get well, but I believe these are of a superficial type that very often does not recur. They are seen most frequently by the man in general practice, and when we get their statistics, we do not accept their findings, because their material has not been checked up by roentgenological evidence. On the other hand, we know that many of the cases that recur never do get well; they never heal, even following gastroenterostomy. Those are the cases seen by the internist or by the clinics because they have failed to obtain relief elsewhere.

We must try to obtain statistics from different sources and from different types of cases to be able to draw fair conclusions, and that is what Dr. Martin has tried to do. I think I can illustrate this also from our experience.

Dr. Martin reports a fairly high percentage of cures of his cases. Dr. Wright, in the out-patient department of the University of Minnesota, has seen a fairly high percentage of cures in his cases, but they admit they are seen in their first attack in many instances. We have gone over our statistics for five years and I was surprised that only a very few of our cases treated medically claim a cure, but many of these patients had had five or six attacks before and had come to us because they did not get relief. Consequently, we can conclude that they were cases of deep seated ulcers that probably never will get complete relief from medical treatment alone. The surgeons often speak only of the mortality rate and not of the bad results otherwise. Jejunal ulcer may develop, a vicious circle may develop, and only about forty to sixty per cent of the cases are permanently relieved. They blame this on the medical men. This is wrong but I think we could help them if we would prepare their patients better for operation. I have been able to observe several cases under the fluoroscope that showed almost complete obstruction and pronounced dilatation. They should not be operated at this time. Under the Sippy method they improved markedly in a few weeks. Therefore, I think the medical man can help the surgeon improve his results by the proper cooperation.

DR. ARNOLD SCHWYZER, St. Paul: I have enjoyed this paper very much. We mostly hear only one side discussed, the medical or the surgical, and at that do not often enough hear of the late results. Surgeons claim very often that they frequently op-

erate on cases after several medical "permanent" cures. So it is important that we come together and hear reports of what medical treatment can do, as well as surgery. We have not had many reports like this and I was anxious to hear what the essayist had to say. It shows that medical treatment has its place. As Dr. Wright has brought out, we cannot say absolutely what results we always are going to have, but most cases should have a thorough trial by medical means, before resorting to surgery.

Three years ago I reported our late results, here in Duluth. I have looked over those cases again. There are not very many cases, but they date back from 3½ to 17 years. There were twenty-seven duodenal ulcers that I was able to trace. One died; he had a perforating ulcer backward into the pancreas. Another case had a gastro-jejunal ulcer after the operation and had to be re-operated. This makes two bad results among the 27 cases traced. Some had varying degrees of improvement and 15 were entirely well for these many years.

The percentage of surgical cures is better than what our medical friend selected from statistics. I think he gave us some statistics that are rather poor surgical results. If we summarize the whole thing, I think it is only fair that we give our patient a medical chance unless he comes with too severe suffering, or after long medical treatment. Those cases we do not attempt to treat medically, but every other case is given a trial. I do not belong to a surgical or medical clinic. Some of our patients come early in their disease and some late, but we never operate unless the patient was given conscientious medical treatment where it seemed of possible value. I have always stuck to the Leube dictum, that if after five weeks strict treatment in bed your patient is not well then it is a surgical case. I enjoyed hearing that there are also medical cures of long standing.

DR. L. L. MERRIMAN, Duluth: The discussion has been interesting and I enjoyed the paper very much. I believe a great deal of truth has been brought out this morning. I am glad to subscribe to what Dr. Martin said in regard to medical management, for I believe it has a very definite place in the treatment of ulcer.

I am free to admit that some cases are distinctly surgical first, those in which there is so high a grade of obstruction that the patient is likely to starve or reach a dangerous state of malnutrition before the medical management can get in its work; second, where you suspect carcinoma; third, in a few cases of pyloric obstruction where it is impossible to get cooperation between the patient and physician; fourth, in case of perforation.

I believe if the medical management is sufficiently intensive and the period of treatment sufficiently long; if proper attention is given to the presence of night secretion; and active foci of infection are removed, that a vast majority of cases of gastric and duodenal ulcer can be successfully treated by the internist.



# APPENDICITIS, DIVERTICULITIS, AND ECTOPIC PREGNANCY WITH SPECIAL REFERENCE TO DIFFERENTIAL DIAGNOSIS\*

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The term "acute abdomen" is now employed rather frequently in referring to pathology of obscure or undetermined origin, and easily includes all of the conditions named above. The relative frequency of these abdominal lesions offers sufficient reason for their consideration.

In a 3 mm. embryo, the stomach is seen as a spindle shaped enlargement anterior to the yolk sac, and the small intestine, as a straight tube, posterior to it. As further development continues the intestine grows in length much more rapidly than the abdominal cavity, and so of necessity becomes coiled. One primary loop is formed at the point where the yolk stalk is attached to it, and this loop projects into the celomic cavity of the umbilical cord.

A pouch-like outgrowth, on the side of the lower limb of this loop gives rise to the processus vermiformis and the cecum, which develop together. This outgrowth continues to enlarge at the point where the colon is joined by the small intestine, till a conical pouch is formed. However, the terminal portion of the outgrowth does not increase in size in proportion to the upper segment, and with subsequent development, the marked difference in caliber is seen between the cecum and the appendix vermiformis of the adult.

It is interesting to note, at a somewhat later period, the torsion of the intestine whereby the large bowel crosses in front of the small, and at a still later period the migration of the colon, which takes the cecum to the under surface of the liver where it remains till the fourth month after birth. It is the gradual elongation of the colon that causes the descent of the cecum with the appendix, to its normal adult habitat in the right iliac fossa. Failure to entirely complete this migration accounts for some of the anomalous positions of the appendix, sometimes seen.

The yolk-stalk is attached to the primary loop

of intestine, mentioned above, at its most ventral portion as it lies in the umbilical celom. During the course of development this attachment normally disappears, but in from two to three per cent of cases it persists as an outgrowth, from the intestine, which is similar to it in structure and size and from 1 to 5 cm. in length. This outgrowth is usually found on the side opposite the mesentery, about 1 meter proximal to the ileocecal junction and is known as Meckel's diverticulum.

This diverticulum is of much surgical importance inasmuch as it often occasions complete obstruction, by its invagination into the lumen of the intestine. It likewise is subject to acute infection, with symptoms very similar to those seen in acute appendicitis.

Appendicitis is the most common of all abdominal lesions. It affects all classes of individuals, the very young, and the very old; but it is essentially a disease of young adult life. Its manifestations are fairly constant, but there is a wide variation in the symptoms in all types of cases.

The appendix normally lies in the right iliac fossa, but may be found in various parts of the abdomen. The most frequent anomalous position is near the under surface of the liver and this is explained by a failure in the elongation of the colon after birth. Occasionally the entire large bowel lies to the left of the median line, in which case the cecum and the appendix are found in the left iliac fossa. This position follows a lack of torsion of the large bowel in embryonic life.

The appendix is so situated that pathologic processes are easily developed; with a movable cecum above and a freely movable ileum mesially, a certain degree of fixation by its own mesentery, tension on its own blood supply is easily brought about. This tension easily produces congestion, and this stasis facilitates infection.

The appendix is a vestigial organ without real function; therefore its power of resistance is lowered. Its opening into the cecum is unguarded, except for a very slight fold of mucosa which is not at all efficient. Its dependent position facilitates the passage of fecal material into its lumen. The disproportion of its length to the size of its lumen; its removal from the

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direct intestinal current; and the normal weakness of its muscle coats, all predispose to a stasis which is responsible for the large number of fecal concretions found within it.

The large amount of lymphoid tissue normally present in its mucosa facilitates rapid swelling and partial or even complete occlusion of the organ. This factor, together with others mentioned above, obstructs drainage; and obstructed drainage facilitates pathologic processes. It is always desirable to keep the appendix emptied.

Presence of fecal concretions causes epithelial necrosis and epithelial necrosis is usually followed by infection. This infection is usually introduced at the point of necrosis directly into the wall of the appendix. Some observers maintain however, that it may be of hematogenous origin and assert that it is a direct sequence of a tonsillitis, or some similar type of infection. However, this assertion needs more definite proof than has yet been brought forth. The usual organisms found are the bacillus coli, streptococcus pyogenes, staphylococcus aureus or albus, the pneumococcus and bacillus tuberculosis. In special cases foreign bodies may lodge in the appendix and they, like the fecal concretions, predispose to infection. Intestinal parasites not infrequently are found in the appendix.

These areas of infection are followed by necrosis of the surface of the mucosa with consequent loss of the epithelium. This is followed by infiltration of polymorphonuclear leucocytes. If the infection be not severe, small abscesses form within the appendiceal wall and these may rupture within and restoration of normal conditions follow; or they may rupture without and be followed by a localized or generalized peritonitis.

A continuation of the infective processes not infrequently results in a destruction of the normal tissues of the appendix and in replacement by connective tissue, and the appendix is then represented by a fibrous cord. In many cases the lumen of the appendix is entirely occluded in its distal portion or throughout its entire length.

In the early stages of an acute infection, numerous petechial hemorrhages are found in the submucosa, and this may be the only evidence

of pathology if the appendix is removed in the very early stages of the disease.

Not infrequently the neck of the appendix is entirely occluded by the pressure of fecaliths. This occasions the retention of fluids within, and a complete destruction of the mucosa due to the increased tension.

*Appendicitis.*—The first symptom in acute appendicitis is *pain*. The pain is diffuse over the entire abdomen at first and is usually colicky in character. The superior mesenteric plexus of the sympathetic system supplies the appendix as well as the small intestine, and accounts for the diffuseness of the pain. In the early stage the maximum pain is in the epigastrium and very soon localizes in the right lower quarter.

Tenderness is now present at McBurney's point, which represents the base and not the tip of the appendix. Pain and tenderness vary in position according to the position of the appendix, which may point in any direction, from its base. It is quite possible in some cases to accurately prognosticate the position of the appendix, after a careful palpation of the abdomen.

Nausea and vomiting follow closely the incidence of the pain. The vomiting may be reflex, or due to reversed peristalsis. If reflex it soon ceases.

Muscular rigidity is rather constant. It is found in the rectus or the oblique muscles. When present, it does not always mean peritonitis, but may be due to irritation of the superior mesenteric plexus, which receives its communicating branches from the lower six intercostal nerves.

Murphy states that elevation of temperature is always present during the early course of the attack. That it is not always found may be due to inaccurate observation. Some rapidly fulminating cases, as proved by operation, show no initial rise of temperature at all.

Leucocytosis, varying from ten thousand to thirty thousand with a large preponderance of the polymorphonuclear type is usually present, and is dependable in a large percentage of cases. Given these symptoms, occurring in the order named and the diagnosis is not difficult. In some cases they are not so plainly manifest, so we must make, in the absence of the preliminary



chill and fever, a diagnosis with nothing but pain and leucocytosis present.

Complications are numerous. Among the most frequent is peritonitis due to rupture of the appendix, and subsequent abscess formation. Pus accumulations are found anywhere from the sub-phrenic area, on the right downward into the pelvis, and across to the region of the sigmoid. The abscess may be intraperitoneal and lie anterior to the cecum; it may be extra-peritoneal and lie behind the cecum. The abscess wall is frequently formed in part by coils of intestine which become matted together by a plastic exudate, the result of which may be a partial or a complete obstruction.

*Thrombo-phlebitis* of the mesenteric or iliac veins may occur and is a most serious complication, as it usually proves fatal.

*Diverticulitis*.—The diverticuli of the intestinal tract are of two kinds:

(a) Congenital (Meckel's),

(b) Acquired (usually found in the sigmoid, less frequently in the small intestine).

Acute diverticulitis of the congenital type may result from ordinary bacterial infection, the presence of a typhoid ulcer, a tuberculous infection, from torsion (followed by gangrene when the diverticulum is held by adhesive bands attached to its distal end) or the presence of foreign bodies.

The attack is very like acute appendicitis, from which it may be differentiated with the greatest difficulty, or not at all, in the early stage. Later when the symptoms of intestinal obstruction occur, the diagnosis is somewhat simplified. When perforation occurs, general peritonitis follows. The pain in diverticulitis, is nearer the median line than in appendicitis. It is usually above and mesial to McBurney's point, or it may be just below the umbilicus. Muscular rigidity is found at the pain point. There may be blood in the stools, both macroscopic and microscopic. The presence of a pre-existing umbilical fistula is also helpful in the diagnosis.

This condition may also be confused with intestinal obstruction. In diverticulitis, there is evidence of intra-abdominal inflammation, (pain, localized tenderness, rise of temperature, leucocytosis, muscle rigidity), while in obstruc-

tion the obstruction itself is the most prominent manifestation.

Acquired diverticulitis presents quite a different picture. Congenital diverticulitis is usually found in children or young adults, while acquired diverticulitis is a disease of older age. It is usually found in the sigmoid, and is due to ulceration of the mucosa by hardened feces, followed by infection and all the pathologic changes, due to a process of that kind.

Differential diagnosis must be made from carcinoma, and this may require the microscopic examination of the involved tissue; from chronic inflammation of the sigmoid; from appendicitis in the left inguinal region; from salpingitis; and from tuberculous involvement. The diagnosis is difficult, and often requires an abdominal section to complete it.

The differential diagnosis of appendicitis is a most interesting, and sometimes a most difficult problem to solve. Differentiation must be made from lesions in the upper abdomen, namely:

1. Perforation of gastric or duodenal or intestinal ulcer.
2. Acute cholecystitis.
3. Cholelithiasis.
4. Pyelitis or perinephritic abscess.
5. Nephrolithiasis.

Sudden perforation of the gastro-intestinal tract from ulcer, or other cause, is often confusing and offers marked difficulty in differentiation, so similar are the manifestations. A carefully elicited history of the patient's previous condition should be of great assistance in such cases.

In the lower abdomen, differentiation must be made from, namely:

1. Chronic inflammation of cecum.
2. Tuberculous inflammation of cecum.
3. Intestinal tuberculosis.
4. Acute cystitis.
5. Acute inflammation of ureter.
6. Typhoid ulceration.
7. Salpingitis.
8. Twisted tumor pedicle.
9. Diverticulitis.
10. Carcinoma of cecum.
11. Stone in the ureter.
12. Intestinal stone.

13. Right sided pneumonia.
14. Developing herpes zoster.
15. Intestinal fermentation (acidosis).
16. Ectopic pregnancy.

In women acute right salpingitis presents grave difficulty in diagnosis, and where the appendiceal involvement is primary, with its tip attached to the ovary or tube, or where the tube is first involved, with secondary inflammation in the appendix, an absolute diagnosis may be quite impossible. There are other perplexities, but it is not necessary to go into detail with all these conditions for a mere mention of them is sufficient to remind us that great care and sufficient deliberation be used in arriving at correct conclusions.

*Ectopic pregnancy* is usually recognized from its well known symptoms, among which are:

1. Cessation of menstruation together with nausea, and other usual symptoms of normal pregnancy.
2. Sudden onset of pain in one side of the pelvis, and a repetition of the pain at intervals.
3. Bloody vaginal discharge simulating a menstrual period with irregular recurrences of the same.
4. A tender, rounded mass beside the uterus. A gradual enlargement of this mass.
5. Decidual cells cast off from the uterus or demonstrated in scrapings.

When these symptoms obtain, a positive diagnosis is readily made. It becomes necessary in many instances to differentiate the condition from a chronic salpingitis with an acute exacerbation, where we find a tender mass, gradually enlarging, a slight degree of fever, and some menstrual irregularity. This problem is especially difficult of solution where the pyosalpinx gradually enlarges, the pain increases, then becomes suddenly sharp and severe, followed by rupture of the tube and collapse of the patient due to an abdomen full of pus.

Again the diagnosis may not be clear, if we are dealing with a ruptured true or false corpus luteum with hemorrhage. If it be a true corpus luteum, abortion will supervene, together with the discharge of placental tissues, but if a false corpus, there will be a premature menstrual flow, and no placental tissue. Where the ectopic pregnancy is in the end of the right

tube, being absorbed or expelled, it may easily be confused with an acute appendicitis. Where a chronic inflammation of the appendix exists together with a cystic right ovary, gradually increasing in size, a positive diagnosis is difficult.

Further differentiation must be made from perforation of the stomach, biliary colic, ureteral calculus and small intramural or submucous leiomyomata of the uterus. Diagnosis before rupture is rather infrequent, but is greatly facilitated after rupture and hemorrhage into the ovum or the tube.

During the past few years the recognition of hyperalgesic areas has given valuable aid in making more accurate diagnosis of intra abdominal conditions. It is now well recognized that pathologic conditions of deeply situated organs in the abdomen give rise to corresponding tender areas in the skin and superficial tissues.

By the use of local anesthesia opportunity has been afforded to definitely prove that there is no pain in the abdominal viscera due to handling, but immediately that peritoneal attachments are put under tension, the patient complains of severe pain. These organs do not possess ordinary sensation, but the pain elicited by trauma is due to a viscerosensory reflex and is referred to the overlying superficial structures. This viscerosensory are comprises afferent impulses from the viscus to the spinal cord and efferent impulses from the spinal cord to the body wall.

When an organ is involved by an infective process, an irritable focus is established in the spinal cord; hence, a stimulus applied to the corresponding area of the body surface, gives rise to an abnormal response, and the patient complains of pain. This is what is meant by an hyperalgesic area, and when carefully sought, gives most definite and positive information as to the pathologic conditions of corresponding viscera in a large percentage of cases.

These hyperalgesic areas are divided into two groups, the lateral, and the mesial. Among the lateral, are the gall-bladder, the appendiceal, and the tubal areas, while the gastro-duodenal, the large and the small gut areas are in the mesial group. When carefully determined, they offer most valuable aid in the differentiation of acute abdominal conditions involving



mucosal or submucosal tissues. Early observation of these acute lesions is desirable, and of much assistance in arriving at a right diagnosis.

With intelligent, careful and painstaking observation and examination of each patient, these conditions usually will be recognized correctly, and many unnecessary surgical operations will be avoided.

# A STUDY OF THIRTY-FOUR CASES TREATED BY EPIDURAL INJECTIONS AND REMOVAL OF FOCI OF INFECTION TREATMENT OF SCIATICA\*

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The results of treatment by epidural injections of saline solution containing novocain and the removal of foci of infection in thirty-four cases of sciatica observed in the Mayo Clinic during a period of two and one-half years form the basis of this study.

I have not attempted to classify the cases into sciatic neuritis and sciatic neuralgia, for such a classification is not always possible. Cases in which the sciatic pain could be attributed definitely to some bony condition and cases in which doubtful diagnoses were made have been eliminated from the report.

TABLE 1.

## PRINCIPAL SYMPTOM: PAIN

|   | Patients |
|---|----------|
| Sciatic nerve distribution (100 per cent) . . . . . | 34       |
| Sacro-iliac region (94 per cent) . . . . .          | 32       |
| Lumbar region (same side) . . . . .                 | 27       |
| More or less constant . . . . .                     | 20       |
| Definite attacks with free intervals . . . . .      | 14       |

## POSSIBLE ETIOLOGIC FACTORS

|  | Patients |
|--|----------|
| Strain or wrench of back . . . . .                               | 9        |
| Acute infection . . . . .  | 6        |
| Exacerbation of sciatica (chronic cases)<br>with colds . . . . . | 5        |
| Occupational . . . . .   | 3        |

## PHYSICAL AND ROENTGENOGRAPHIC FINDINGS

|   | Patients |
|---|----------|
| Lasegue's sign positive (94 per cent) . . . . . | 32       |

|  |    |
|--|----|
| Tenderness over trunk of sciatic nerve (88 per cent) . . . . .             | 30 |
| Achilles' reflex diminished or absent (50 per cent) . . . . .              | 17 |
| Atrophy of muscles or affected extremity (38 per cent) . . . . .           | 13 |
| Some limitation of motion in the spine . . . . .                           | 9  |
| Hypertrophic arthritis of the lumbar spine . . . . .                       | 3  |
| Sacro-iliac disease (?) . . . . .  | 2  |
| Hypertrophic arthritic hip . . . . .                                       | 1  |
| Lesion of fourth and fifth lumbar vertebrae (character doubtful) . . . . . | 1  |
| Old healed fracture of the femur . . . . .                                 | 1  |
| Sacralization of the fifth lumbar vertebrae . . . . .                      | 1  |

It will be noted that pain along the sciatic nerve is the most common subjective symptom, being present in all the cases. Pain in the sacro-iliac region was present in 94 per cent of the patients, backache on the same side in 68 per cent, and backache on the opposite side in 29 per cent. Bilateral sciatica was present in two patients (6 per cent). Tenderness over the sciatic trunk was a constant objective finding.

The bony changes were not marked; in none of these cases were they demonstrated to be a cause or a factor in producing the sciatica.

After all the palpable causes of sciatica, such as malignant growths pressing on the lumbosacral plexus, subluxation of the sacro-iliac joint, syphilis, diabetes mellitus, pelvic tumors, and so forth, have been eliminated, there still remains a large group, perhaps the larger group of cases of sciatica, in which infection must be looked on as the cause of the pain. The exact seat of the pathologic process is not always determinable. Dejerine and his school classify sciatica into neuritis of the trunk and neuritis of the roots. The fact that 94 per cent of the patients experienced pain over the sciatic distribution down the affected leg during the epidural injections, and not on the opposite side, is evidence that either the roots or the ganglia were hypersensitive compared with those of the unaffected side. The pressure of the fluid can come in contact only with the root covered by the fold of the dura, or with the ganglia in the foramina and slightly beyond, as was shown by dissection of a recently dead body in which 60 c. c. of methylene blue were injected into the epidural space. The fluid passed epidurally to the upper cervical region. In fact, there was as much fluid in the cervical region as in the lum-

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bar region. The fluid passed to the outer edge of the ganglia to the point where the dorsal nerves are given off, but slightly farther distally in the sacral region. None of the fluid reached the subdural or subarachnoid spaces. Were the inflammation located exclusively distal to the ganglia, pain from the pressure of the fluid only should not be experienced down the affected leg. Interstitial fibrosis and thickening of the sheath of the sciatic trunk have been described, but I have been unable to find reports of careful histologic studies of the roots and ganglia in patients with sciatica coming to necropsy. As yet knowledge of the pathologic changes and the location of the lesion in the so-called idiopathic sciatica is incomplete. In view of the fact that the greater percentage of the cases in this series were probably caused by infectious processes either directly affecting the roots, ganglia, or trunk of the sciatic nerve, or by toxic products from infection elsewhere in the body which caused deleterious changes in some of these structures, it is considered important to remove all possible foci of infection. Fourteen of the thirty-four patients had infected tonsils for which tonsillectomies were performed. Twenty-three patients had foci of infection around the teeth and the teeth were removed, or removal was recommended.

The technic of epidural injection for sciatica is simple. It has been described quite fully by Cathelin, Strauss, and others. A 10 c. c. Luer syringe with an ordinary spinal puncture needle is used. The needle is introduced into the sacral canal for from 5 to 6 c.m. Care is taken not to introduce it farther, since there is danger that the spinal subdural space may be entered because of the reflection in most persons of the the dural sheath around the upper margin of the second sacral vertebrae. After the introduction of the needle, the trocar is removed and suction made with the syringe in order to be sure that no cerebrospinal fluid escapes. If it does, the needle is withdrawn for 2 or 3 cm. The solution used in the Mayo Clinic usually is 0.5 per cent novocain in physiologic salt solution. The solution is introduced very slowly; for from ten to twenty minutes is necessary for the injection of from 40 to 50 c. c. Ordinarily 50 c. c. is sufficient. The injections may be repeated every forty-eight hours if relief is not

obtained. At times seven or eight injections may be required. It has been our experience that after the first injection the pain is in most cases relieved entirely for from two to three hours and ameliorated for the next two to ten days, and the patient enjoys a full night's rest.

Of the thirty-four patients treated by epidural injections, fourteen received one injection, thirteen two injections, four three injections, two four injections, and one five injections. Nine patients received complete and permanent relief; fourteen received partial relief, which allowed them to return to work; eleven did not receive any permanent benefit from the injection. Temporary relief, that is, for from two days to two weeks, either complete or partial, was obtained by thirty-one patients.

In the greater number of cases foci of infection were removed, either a few days prior or subsequent to the injection; this was probably an occasional factor in the cure. Table 2 gives the relation of eradication of the foci to the results; the data are of interest, but definite conclusion can not be drawn from them.

TABLE 2

| RELATION OF ERADICATION OF FOCI TO RESULTS  |    |
|---|----|
| Patients with permanent relief.....         | 9  |
| Foci of infection removed in.....           | 5  |
| Patients with partial permanent relief..... | 14 |
| Foci of infection removed in.....           | 11 |
| Patients without permanent benefit.....     | 11 |
| Foci of infection removed in.....           | 5  |
| Patients in whom foci were removed.....     | 21 |

While our results are not entirely satisfactory and as yet we do not know what part the injection plays and what part the removal of foci plays in bringing about the beneficial effect, we believe that the procedure is justified in selected cases of sciatica.

## SUMMARY

In thirty-four cases of sciatica in which a definite removable cause could not be found, the removal of possible foci of infection in 62 per cent combined with repeated epidural injection gave a permanent cure in 27 per cent, and permanent amelioration of symptoms; in 40 per cent, the patients were able to continue their occupation with a fair degree of comfort. Thirty-three per cent did not obtain permanent beneficial results.

## DISCUSSIONS

A MEMBER: In 32 of these cases I understand



there was sacroiliac pain, and stretching of the nerve gave pain in 34 cases. I would like to ask if in simple sacroiliac disease bending of the thigh upon the hip with the knees straight does not give pain in many instances.

DR. OTT: It does in sacroiliac disease.

DR. H. W. MEYERDING, Rochester, Minn. It has been my good fortune to examine many of the patients reported by Doctor Ott in this series; they had come to the orthopedic section of the Mayo Clinic for an examination. It would seem that the important points are to determine the etiologic factor and to relieve the patient of pain. Many of our patients with sciatic pain have a history of sacroiliac strain followed in several weeks by pain along the sciatic nerve; later, there is listing to one side or the other with flexion of the spine and lumbar

muscle spasm. Many are relieved by strapping of the back with adhesive about the pelvis, the wearing of a sacroiliac belt, application of a body cast, rest, or Buck's extension to both legs and a small pillow under the back. It has been my observation that some patients have been relieved by the epidural injection when other methods have failed to give benefit, and I believe it is a valuable method of relief of pain even if the injection must be repeated in patients who have suffered much and required opiates, and so forth for relief. In this series I believe most of these measures have been tried without success. Hypertrophic arthritis of the spine and sacroiliacs should be considered as a frequent cause of secondary sciatica which will last until fusion of the joints or until the inflammation has subsided. All foci of infection should be eradicated in addition to whatever other treatment is applied.



## THE VITAL CAPACITY OF THE LUNGS IN CARDIAC DISEASE\*

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After an individual takes into his lungs as much air as he possibly can, the amount which he then expires by the deepest possible expiration is his vital capacity. The vital capacity is composed of three elements; tidal air, complementary air and supplemental air. (Fig. 1) Tidal air is the air that enters and leaves the lungs with each respiration at rest. Complementary air is that amount which can be taken into the lungs over and above the normal inspiration. Supplemental air is the air which can be given out after the normal expiration. The vital capacity is the total of these three. Even after all the air has been expelled from the lungs by the deepest possible expiration, there still remains a volume of air which it is impossible to remove. This is called the residual air. It is only within the recent years that the relation of changes in these volumes of air to pathologic conditions has been studied.

There is a wide variation among normal healthy individuals in the volume of air which can be expired after the maximum inspiration. In order then for vital capacity studies to be of any value in disease, there must be standards for the determination of the normal vital capacity. The variations in normal vital capacity depend chiefly on two factors; (1) sex, and (2) certain body measurements. Hutchinson<sup>1</sup> in 1846 with his invention of the spirometer, made an extensive study of the vital capacity of normal individuals. He concluded that the vital capacity varied more closely with height than any other body measurement. There has been considerable criticism of Hutchinson's work on the basis that the variation for each height is too great. In 1917, Peabody and Wentworth<sup>2</sup> studied the vital capacity of 140 normal individuals. They concluded that a classification based on height and sex was sufficiently accurate. They di-

vided each sex into three groups according to height and determined the average vital capacity for each group. Later Lundsgaard and Van Slyke<sup>3</sup> made a thorough and complete study of this problem. Their conclusions were that the logical measurements to use were those which would determine the chest volume. They considered the chest as a geometric figure of three dimensions and calculated its volume from the product of these. They established, from their observations, certain constants by which the vital capacity could be calculated from the chest volume. Still more recently, Georges Dreyer<sup>4</sup>, in an extensive study of this subject, brought forth several formulae for the calculation of vital capacity. He showed that there was a relationship between vital capacity and various body dimensions, but decided that it could be most accurately estimated from the body surface. Two other studies of this subject have appeared in the last two years. West<sup>5</sup> made a study of 120 normal individuals comparing the several standards and concluded that a standard based on body surface was most exact, and in cases in which the weight could not be obtained, a standard based on height alone was sufficiently accurate. Myers<sup>6</sup> simplifies the determination of the normal vital capacity for the clinician, by presenting a table of figures giving the vital capacities for any weight from 100 to 200 pounds as calculated by Dreyer's formula. He also produces two empirical formulae for men and women, which he believes sufficiently accurate for clinical use.

With standards established for the determination of the normal vital capacity, attention has been turned to the study of the vital capacity of the lungs in pathological conditions. Several investigators<sup>2, 7, 8</sup>, have made studies of the vital capacity in cardiac disease, and it has been found definitely reduced especially in those cases in which dyspnea was a symptom.

It was thought that a further study might be of value, with especial reference to the practical application of vital capacity studies in heart disease. This study was made on 120 cases. An attempt was made to correlate the clinical findings in each case with the vital capacity. The cases were analyzed clinically from the history, physical findings, and laboratory data. In practically all cases, there was

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also a roentgenogram of the heart and electrocardiogram. From these data, a diagnosis of the lesion was made, and an estimation of the cardiac function was attempted. In the history, the following were gone into carefully: (1) the question of exertion dyspnea; (2) the ability of the patient to carry on his work; and (3), the degree of limitation of activities necessary. The vital capacity was determined in each case by means of a calibrated gasometer. The patient was directed to fill his lungs as completely as possible and then expire completely into the gasometer. Several determinations were made and the highest reading considered as the vital capacity. Usually after one or two attempts, the readings remained remarkably constant. Readings were taken with the patient rested and several hours after a meal, although the presence of a moderate amount of food in the stomach does not seem to alter results. Most of the subjects were ambulant cases and readings were taken with the patient standing; while in those confined to bed, the readings were made in the position most comfortable for the patient. Although it is a relatively simple matter to take a vital capacity reading, certain errors may arise. The patient may not co-operate properly, and thus not use his maximum effort either in inspiration or expiration. Others attempt an additional expiration after their final effort. These sources of error were carefully watched for, and questionable readings were not used. It might be mentioned here, that the procedure seems to have no ill effect on the subject even in those severely disabled. The normal vital capacity in each case was estimated from the standards of West; (1) because the necessary measurements are easily obtainable; and (2) because the investigations of both Dreyer and West agree that vital capacity varies more closely with body surface than any other dimension. The body surface in square meters can be easily determined from the height and weight by the graphic formula of DuBois and DuBois<sup>9</sup>. The vital capacity is then calculated by multiplying this figure by 2 in females and by 2.5 in the case of males. The result is in liters of air. For instance, if the body surface were found to be 1.6 square meters, the cal-

culated normal vital capacity would be 3.2 liters for a female and 4 liters in males.

Of the 120 cases studied, 96 were ambulant cases under observation in the cardiac division of the outpatient department. They were, with a few exceptions, in a good state of cardiac function, representing the type of patient who might be seen in a physician's office. The remaining 24 were patients who were confined to bed for various periods of time, and were studied in the wards of the General Hospital. There were approximately 200 observations made on the entire series. In the group there were 71 males and 49 females with the ages varying from 16 to 73. The largest proportion of the cases however, were under 50 years of age. The patients were referred to the cardiac clinic, either because of symptoms referable to the heart, or because of suspicious signs observed elsewhere. It might be emphasized, that in all cases, a cardiac lesion was suspected. However, of the 120 cases, cardiac disease was found in only eighty-four. In the remaining thirty-six, there was no cardiac pathology found. Most of these were diagnosed as neurasthenia, effort syndrome or cardiac neurosis.

A comparison of the findings in the two groups is of interest. In the cardiac group, the vital capacity readings varied from 900 c.c. to 4200 c.c. For this group, the normal vital capacity, as estimated from body surface, varied from 2480 c.c. to 5425 c.c. In the non-cardiacs, the vital capacity readings varied from 1800 to 5300 c.c. The estimated normal vital capacity for this group varied from 2680 to 4925 c.c. Figures 2 and 3 show the distribution of the cases in each group as compared with the calculated normal figures. It is clear that in the cardiacs, the vital capacities as read on the gasometer are definitely reduced as compared with the calculated normal figures. In the non-cardiacs, there is a much greater approximation of the two curves. The lower figures in the non-cardiacs are in cases of marked obesity in whom a reduced vital capacity is to be expected. That a definite reduction of vital capacity is present in the cardiac group is also shown by a comparison of the average figures in each group. In the cardiacs the average reading was 2303 c.c. as compared with an average calculated figure of 3842 c.c. In the

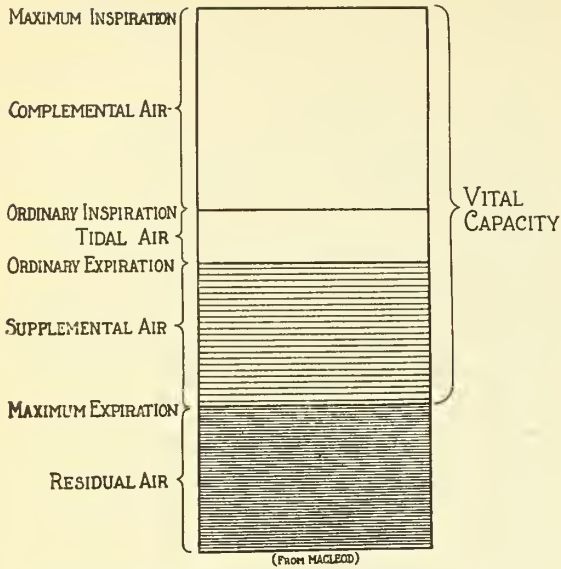


Fig. 1. Graphic representation of lung volumes, (from Macleod).

non-cardiacs the average vital capacity reading was 3586 c.c. as compared with the average estimated normal figure of 3938 c.c. In each case, the percentage of the normal vital capacity was calculated. The lowest cardiac reading was 23.2 per cent of the estimated normal for that case. The highest was 95 per cent of the normal. The lowest non-cardiac reading was 60 per cent of the normal, and the highest 122.4 per cent. The average per cent of the normal vital capacity in the cardiac group was 59.04, in contrast to 84.4 per cent in the non-cardiac. There is then, a very definite reduction in vital capacity among the cardiacs, and when it is remembered that the largest number of these cases were ambulatory and fairly well compensated, it is evident that cardiac impairment is accompanied by reduction in vital capacity which is neither slight nor questionable, but very definite and unmistakable. In the non-cardiac, there is also a slight

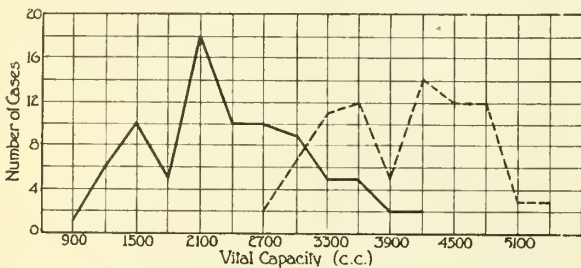


Fig. 2. Comparison of actual vital capacity (solid line) and estimated normal vital capacity (broken line) in the cardiac group.

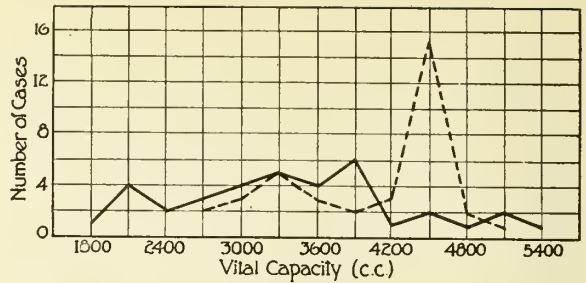


Fig. 3. Comparison of actual vital capacity (solid line) and estimated normal vital capacity (broken line) in the non-cardiac group.

reduction. It must be remembered however, that these cases were not really normal individuals but had some impairment of general health, and furthermore, a number were very obese individuals, in whom a reduction is also to be expected. Figure 4 illustrates graphically the comparison of the vital capacity in the cardiacs and the non-cardiacs.

In attempting to correlate the vital capacity with the presenting symptoms, one finds that by far the most common symptom in the cardiac group is dyspnea on exertion. In the cardiacs, 62 of the 84 cases or 73.8 per cent complained of varying degrees of dyspnea. In the non-cardiacs, 11 or 30.5 per cent complained of this symptom. It is interesting to compare the vital capacities of the cases in each group, complaining of dyspnea. In the cardiac group, there was a definite reduction of vital capacity, and the greater the degree of dyspnea, the greater the reduction in vital capacity. It is worth while emphasizing that there was not a single case among the cardiacs complaining of dyspnea, which did not have a definite reduction of vital capacity. This finding is of great importance, as it may serve as a means of differentiating cardiac dyspnea from other forms of respiratory distress. In the non-cardiacs, on the other hand, although dyspnea was complained of, a vital capacity within the normal limits was found in practically all cases. In a few cases a reduction was found, but this occurred either in cases suffering from muscular asthenia or in obese subjects in whom such a finding is to be expected. In the cardiacs suffering from dyspnea, the average reading was 53.4 per cent of the normal as compared with 77.8 per cent in the non-cardiacs.

An attempt was also made to correlate the vital capacity with the anatomical lesion of the



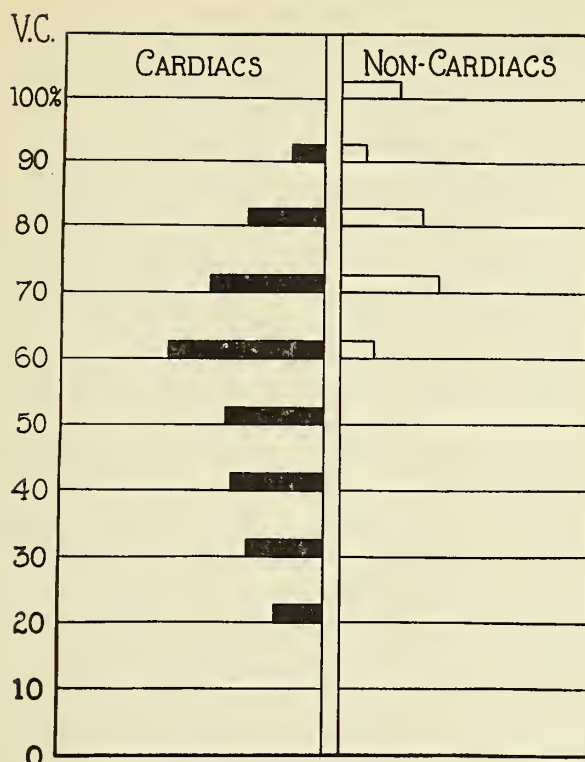


Fig. 4. Comparison of vital capacities by percentage of normal in cardiacs and non-cardiacs. Length of bars indicate the number of cases.

heart. Although practically every type of cardiac lesion was represented in the series, there is apparently very little relation between the vital capacity reduction and the type of pathologic change. However, when the heart is studied not from the standpoint of anatomical damage but from the disturbance in function, a close relation is found to exist between impaired cardiac function and the vital capacity. Clinically, we are accustomed to accept the tendency to dyspnea on exertion as the earliest sign of functional disturbance of the heart muscle. This is the most constant and reliable evidence of a damaged heart, and the best test of heart function that we possess at the present time, is a careful history with especial reference to the degree of limitation of activities that is necessary, and a close investigation into the tendency to dyspnea. When the cardiac function is estimated by these criteria and compared with the vital capacity, a strikingly close relationship is found.

In the cardiac group of eighty-four cases, there was a wide variation in the degree of functional disturbance of the heart, and like-

wise a wide variation in the degree of vital capacity reduction. The highest vital capacity reading was 95 per cent of the normal estimated figure, and the lowest 23.2 per cent of normal. The most marked vital capacity reductions were accompanied by evidences of definite cardiac impairment while, as the readings more closely approach the normal, the history pointed to a heart in good functional condition. Of the eighty-four cardiacs, an estimation of the function of the heart was attempted in eighty (Fig. 5.) Of these, seven had a vital capacity of 30 per cent of the normal or less. All of these cases were acutely decompensated. All were confined to bed, and in every case, dyspnea was present even at rest. Sixteen cases had a vital capacity between 30 and 50 per cent of the normal. Five or about one-third of these were in bed. All showed

|                           | % OF NORMAL VITAL CAPACITY |       |       |       |     |
|---------------------------|----------------------------|-------|-------|-------|-----|
|                           | 20-30                      | 30-50 | 50-70 | 70-80 | 80+ |
| NUMBER CASES              | 7                          | 16    | 28    | 17    | 12  |
| % IN BED                  | 100                        | 31.2  | 7.4   | —     | —   |
| % UNABLE TO WORK          | 100                        | 87.5  | 21.4  | 5.8   | —   |
| % VERY LIGHT WORK         | —                          | 12.5  | 42.8  | 41.1  | 25  |
| % WORK SLIGHT RESTRICTION | —                          | —     | 28.5  | 41.1  | 50  |
| % NORMAL WORK             | —                          | —     | 7.4   | 11.8  | 25  |

Fig. 5. Table showing the relation between the reduction in vital capacity and functional efficiency of the heart as estimated from the patient's history.

dyspnea on very slight exertion and many had edema of the ankles. Of the eleven who were not confined to bed, nine were unable to do any work. In two cases or 12.5 per cent, light housework was attempted, but even this slight exertion brought on dyspnea. Twenty-eight cases had a vital capacity between 50 and 70 per cent of the normal. Of this number, two or 7.4 per cent were confined to bed. Six or 21.4 per cent stated that they were unable to carry on any of their work, and in two cases or 7.4 per cent, no limitation of activities seemed to be necessary. The remaining twenty stated that they were attempting to carry on

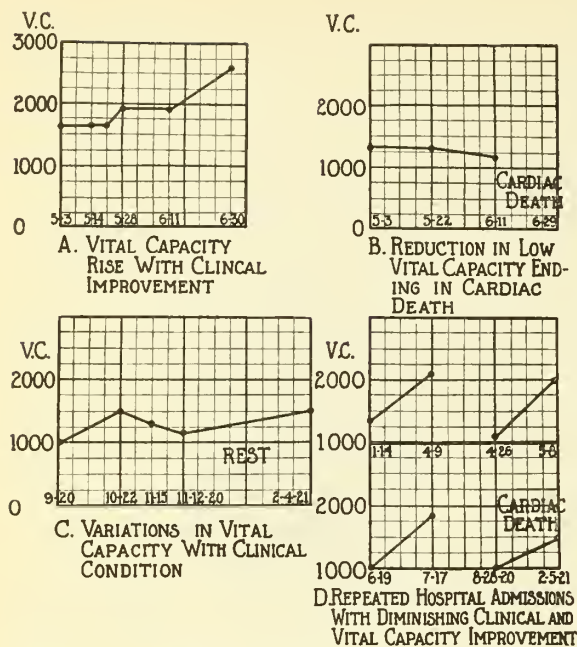


Fig. 6. Concomitant variation in vital capacity and clinical condition in cardinals.

their work, but that they found that a definite limitation of the activities was necessary, twelve or 42.8 per cent being able to do only very light work, while the remaining eight or 28.5 per cent claimed that only a minor degree of restriction was necessary. In the histories of these patients, such statements as "able to work but tire easily", "can do light housework but no washing", "are comfortable when walking on level ground, but become short of breath on climbing", "able to do their work, but must do it slowly", and similar complaints were common. All these indicate that a definite cardiac impairment was present. There were seventeen cases having a vital capacity between 70 and 80 per cent of normal. There was not a single case confined to bed. Of the group, one or 5.8 per cent were unable to carry on any work. Seven or 41.1 per cent could do but very light work, and seven or 41.1 per cent could do work with but slight restriction, and in two cases, or 11.8 per cent, the normal amount of work was tolerated, without any discomfort. There were twelve cases with a vital capacity above 80 per cent of the normal. All were in good state of compensation and all were able to carry on work of some form. Three cases or 2 per cent were able to do light work only; six or 50 per cent found that only

a slight restriction was necessary, and the remaining three or 25 per cent claimed they were able to carry on their normal amount of work without any distressing symptoms.

#### THEORETICAL CONSIDERATION

Although it is evident that in cardiac disease there is a definite reduction in the vital capacity, and that this reduction parallels the degree of cardiac impairment, the explanation of this phenomenon is still somewhat obscure. The problem is best approached by considering the factors involved in the mechanics of normal respiration. The passage of air into and out of the lungs depends on the fact that both the thoracic cavity and the lungs can alter their size. During inspiration, the enlargement of the thoracic cavities produces a diminution in the intra-thoracic pressure. Air rushes into the alveoli under atmospheric pressure, distending the lungs. Since the alveolar walls are elastic, after being stretched during inspiration, during expiration they return to their original size. The maximum volume of air that can be taken into and passed out of the lungs depends then first, on the ability of the thorax to alter its size, and second, on the ability of the lungs to expand and contract correspondingly. The vital capacity can thus be influenced by changes in any of the tissues involved in the respiratory movements, i. e. (1) anything interfering with the normal enlargement of the thorax, and (2) anything reducing the normal movement of the lungs. Those affecting the thoracic mobility are deformities of the chest, ossification of the costal cartilages, weakness of the respiratory musculature and increased abdominal pressure, such as may be due to air, fluid, or tumors. Those limiting the movements of the lungs may be tumors, air or fluid in the pleural cavity or changes in the lungs themselves, such as acute or chronic inflammations, tumors, emphysema or bronchiectasis.

In the majority of cardiac cases however, all these factors can be ruled out as the cause of the reduced vital capacity. Since a reduced vital capacity in cardiac disease is associated with impaired cardiac function, the mechanism of this reduction may be found in the effect of cardiac impairment upon the tissues concerned in the respiratory activity. The earliest changes occurring in practically all cases of



impaired cardiac function is a disturbance in the pulmonary circulation. There is a stasis and resultant increased pressure in the pulmonary vessels, with engorgement of the capillaries entwining the alveoli of the lungs. These capillaries constitute a considerable part of the alveolar walls, and it is conceivable that changes in them may affect the normal expansibility and elasticity of the alveolar tissue. That these changes do occur as the result of pulmonary congestion following cardiac impairment, has been concluded by v. Bash<sup>10</sup> from a series of carefully conducted experiments. He believes that as a result of the stasis and increased pressure in the capillaries of the lung, there is a condition of "lungenstarre" or lung-rigor produced. In other words, with changes in the pulmonary circulation resulting from impaired heart function, there is a definite physical change produced in the alveolar wall, reducing the normal expansibility and elasticity of the lung. Siebeck<sup>7</sup> first suggested that the reduced maximal respiration in cardiacs depended on alveolar fixation due to altered pulmonary circulation. Heretofore, as pointed out by Mackenzie we have been accustomed to consider rales at the bases of the lungs as one of the earliest evidences of cardiac decompensation. This phenomenon is also due to chronic passive congestion of the lungs, but occurs only when considerable engorgement of the alveolar capillaries has occurred, and fluid exudes into the aveoli. A reduction in vital capacity, although an expression of the same engorgement process occurs, however, at an earlier stage, and may therefore be taken as an earlier evidence of cardiac impairment.

#### PRACTICAL APPLICATIONS

The value of any clinical test may be judged by the relation between the simplicity of its application, and the resultant information obtained. The determination of the vital capacity, although a very simple procedure, apparently gives reliable clinical information, which is of at least as much value, as that obtainable by any other single method of studying the heart. As a result of this study, we have, during the past eighteen months, attempted to employ vital capacity determinations routinely in the study of cardiac cases, and

have found it of definite value in diagnosis, prognosis and as a basis for treatment. However, we wish to emphasize the point, that the vital capacity in any given case is of little value except in conjunction with all the other clinical findings. Furthermore, before any significance can be attached to the interpretation of a vital capacity reading, we must first eliminate all non-cardiac causes of reduced vital capacity. Most of these are fairly obvious and can be found easily on routine examination. Deformities of the thorax, ossification of the costal cartilages, or general muscular asthenia affecting the muscles of respiration can reduce the vital capacity. Resistance to the expansion of the lungs by fluid, air or tumor in the pleural cavity, must be ruled out. Changes in the lung tissue, due to tuberculosis or emphysema, must be considered, as well as abdominal conditions, such as the presence of gas, fluid or tumors which interfere with the diaphragmatic movements. Obese individuals tend to have a reduced vital capacity, probably because of increased intra-abdominal pressure, as well as flabby respiratory musculature. As a rule there is little difficulty in determining whether or not any of these factors are playing a part in the reduction of a vital capacity; and when these have been ruled out, it has a definite cardiac significance.

As an aid in diagnosis, we have found the determination of the patient's vital capacity of value in two different types of cases. In the first place, in an individual presenting symptoms which might be referable to an impaired cardiac function, the vital capacity assists in determining whether or not any cardiac involvement is present. Secondly, in cases in which the presence of a cardiac lesion is definitely known, it gives a fairly accurate index of that most important phase of cardiac diagnosis, the functional capacity of the heart.

As examples of the first group, we have found in practically all patients with dyspnea, palpitation or edema, but with normal vital capacities, that no cardiac pathology was present. In other words, a normal vital capacity in the presence of dyspnea and palpitation practically rules out a cardiac condition as their cause. Thus, Adams and Sturgis<sup>11</sup> studying the vital capacity of one hundred soldiers in

the "effort-syndrome" group who complained of dyspnea, found no reduction of vital capacity. These patients of course were known to have no disturbance of cardiac function. We might cite an instance of a case of apparent cardiac dyspnea, where the impression of the absence of cardiac pathology was confirmed by study of the vital capacity. This patient was a young man who had suffered two attacks of acute rheumatic fever, during which, attention was called to his heart. He came into the hospital apparently in great respiratory distress, with dyspnea even when propped up in bed. Although his symptoms were so marked that a physician had previously attempted a paracentesis pericardii, his pulse-rate was normal and there was no cyanosis. Despite his severe dyspnea, a practically normal vital capacity was found. No cardiac pathology could be demonstrated, and a diagnosis of cardiophobia was made, largely on the basis of his normal vital capacity. Ultimately, the patient recovered completely under reassurance and suggestion.

It is in the second group of cases, that is, in patients in whom cardiac disease is definitely present, that the application of vital capacity determinations have their greatest diagnostic value, in that they seem to give an index of the functional capacity of the damaged heart. Peabody and Wentworth<sup>2</sup> found that the vital capacity reduction closely followed the clinical condition of the patients, varying directly with the degree of cardiac impairment. An analysis of our series confirms their findings. In the cases where the heart was well compensated, the vital capacities were within normal limits. In those cases, in whom a careful analysis of the history showed that a limitation of activity was necessary, the vital capacity was reduced, and in practically all cases, dyspnea was present when their activities increased beyond the safety point. The lowering of vital capacity followed quite closely the reduction in cardiac function. The reduction of the vital capacity gives an index of the functional state of the heart, provided extra-cardiac factors affecting the vital capacity are ruled out. In many cases in which the history, physical findings and laboratory data have left us undecided as to the cardiac condition, the vital capacity reduc-

tion greatly aided us in estimating the degree of cardiac functional impairment. To sum up, the vital capacity is of value in diagnosis, first, in determining the presence or absence of a cardiac lesion, and secondly in indicating the degree of functional impairment where cardiac pathology is known to be present.

As to prognosis, it may be said that as a rule the lower the vital capacity, the poorer the prognosis. There are exceptions however. There are cases acutely decompensated with a very low vital capacity who improve with a corresponding rise in vital capacity until it may reach a figure approaching the normal. On the other hand, other cases may present a vital capacity but slightly reduced and yet by other methods of diagnosis, such as the electrocardiograph, there is evidence of a cardiac lesion accompanied by a grave prognosis. In these cases while giving an index of cardiac function at the time, the vital capacity does not give an accurate prognostic estimate of the future cardiac course. More accurate conclusions as to prognosis can be drawn from repeated readings giving an indication of the response of the heart muscle to treatment. This of course, is of the greatest significance in prognosis. The greater the increase of vital capacity under treatment, the greater is the degree of cardiac recovery indicated. In the few cases in whom a greatly reduced vital capacity did not improve under treatment, the ultimate outcome was usually fatal. (Fig. 6-B.) J. B. is an example of a case whose prognosis could be based upon repeated vital capacity studies. He entered the hospital on four different occasions with his heart decompensated. On each occasion, his clinical and vital capacity improvement was diminished. On his first admission his vital capacity was 1300 c. c. After eleven weeks, it rose to 2100 c. c. At this time he was very much improved clinically. He left the hospital, but found it necessary to return. On his second admission, his vital capacity was 1100 c. c. On this occasion it rose in response to treatment to 2000 c. c. He was again discharged, but returned on his third admission with a vital capacity of 1000 c. c., which rose after four weeks to 1800 c. c. On his fourth admission, he entered with a vital capacity of 1000 c. c., which never rose above 1500 c. c.



His heart showed a poorer comeback on each admission, finally ending in a cardiac death. (Fig. 6, D.)

Possibly the greatest aid which vital capacity determinations give, lies in its relation to treatment. It (1) gives us a measure of the results of treatment; (2) indicates the maximum point of response to treatment; (3) establishes a cardiac tolerance at this point, and (4) shows whether this cardiac tolerance for work is increasing or diminishing. As the patient improves under treatment, his vital capacity rises, until a maximum point is reached, at which the readings become stationary (Fig. 6, A). This point indicates the greatest degree of recoverability of the heart, and may be taken as a measure of the cardiac tolerance for work. When this stationary point has been reached, further immediate observation is unnecessary, subsequent management will depend largely on the degree of vital capacity reduction at this point. From an analysis of our series, we see that we may estimate the degree of limitation of activity for a given reduction from the normal vital capacity. The patient should then be placed on a regime consistent with his vital capacity reduction. We may carry our vital capacity studies still further and, by taking repeated reading at intervals, we may have an indication of whether our regime is within the limits of the patient's cardiac tolerance. If the vital capacity of the patient on a given regime decreases, we must assume, either that the regime is too strenuous for the patient, or that the patient is not abiding by the physician's orders. As in diabetes, having established the patient's carbohydrate tolerance, we continue examining for glycosuria to determine whether he is remaining within his tolerance, so in cardiac disease, we may use our vital capacity studies to indicate whether the cardiac tolerance has been overstepped.

That these impressions as to the practical value of vital capacity studies in dealing with heart disease, are true can only be definitely determined by a more complete study, which is being undertaken. However, there is little doubt that these applications will not only be confirmed by further study, but that an even wider usage will be established.

## CONCLUSIONS

1. There is a definite reduction in the vital capacity of the lungs in cardiacs complaining of dyspnea.
2. The reduction in vital capacity seems to run parallel to the degree of impairment of heart function.
3. The most probable explanation of the reduced vital capacity is a loss of the normal lung elasticity, due to stasis in the pulmonary circulation.
4. Vital capacity studies have a definite practical value in diagnosis, prognosis and treatment of heart disease.

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## DISCUSSION

DR. M. H. NATHANSON, Minneapolis: It is rather striking that with all the complicated procedures in medicine at present, such a simple procedure as having an individual take as deep a breath as possible and then measuring the volume expired, has not been utilized in the study of disease. There are probably two reasons for this: first, because standards for the estimation of the normal vital capacity have not been established until recently, and secondly, because we have not understood the relation

of vital capacity changes to diseased conditions. Normal standards have now been fairly well worked out, and considerable work has recently been done on the study of changes in vital capacity in disease.

A very striking point brought out is the close relationship between the reduction in vital capacity and the tendency to dyspnea in heart disease. Practically all cases that found it necessary to restrict their activities did so because of dyspnea, dyspnea occurring when they passed a certain point. One might expect that the reduction in vital capacity and tendency to dyspnea could be explained on the same basis, since the two seem to be so closely associated. It is strange that dyspnea has not been properly explained. We suspect a person with dyspnea of having heart disease but we do not know the exact mechanism by which it has been produced. Because of the frequent association of dyspnea with heart disease, we have concluded that shortness of breath is an evidence of impairment of cardiac function. However it would mean a good deal more to us if we could picture the mechanism of dyspnea production on the basis of an impaired heart function. This, I believe we can now do. There has been a prevailing idea that dyspnea is due to a disturbance in the gaseous exchange. This, however, does not occur in ordinary cases and if it did, it would not explain the ordinary discomfort and difficulty in breathing which we term cardiac dyspnea.

When the heart's functional capacity is reduced, in practically all cases there results first, a change in the pulmonary circulation. There is a stasis and increased pressure in the pulmonary circulation and the capillaries entwining the alveoli become overfilled. It has been pointed out that when this change occurs, there is a loss of elasticity in the alveoli. They cannot expand and contract as they normally should. In inspiration our thorax enlarges and our lungs expand correspondingly. If the elasticity of the alveoli is normal, there is no difficulty; but when this reduction in elasticity occurs, the muscles of respiration must work to a much greater degree in order to obtain the same amount of lung expansion. A patient tells us that he becomes short of breath on exertion. This individual is working his respiratory muscles to such a degree, in order to get the proper amount of air through his lungs, that he has discomfort or dyspnea. If this is the correct explanation of cardiac dyspnea, and it is the most plausible at present, it would also explain the association of the reduced vital capacity with cardiac dyspnea. It is evident then that the reduction in vital capacity might be an index of the reduction in alveolar elasticity. Since in heart disease this condition is apparently due to an impairment in heart function, it follows that the vital capacity might indirectly give a measure of heart function and these charts bring out this point.

DR. HAROLD L. RYPINS, Minneapolis: This last chart (Chart 6, D) of Dr. Ulrich's illustrates how

closely the vital capacity follows the course of the disease. This first patient came in with a much reduced capacity but under rest it went up to 2600 and his clinical condition was very good. The second case (indicating) shows a man who also rested in bed. He came in with 1400 vital capacity and it did not go up, but stayed about the same for some time and went down shortly before death. His prognosis is very well shown by the fact that he did not respond to rest. The third case shows a man with about 1500, which goes down a little further on activity, but under rest goes up again. The response to the rest treatment was very good. The last case, with a vital capacity of approximately 1100, went up to 2200. He then went home and returned with his vital capacity at about 900. He was again put to bed and this time it went up to 2000, when he again discharged himself and came back after a time with a vital capacity under 1000, and this time under rest it went up to only 1800. You notice that each time under rest the vital capacity increase goes down a little. The last time he came in the vital capacity was down and under rest it went up to only 1500. He could not recover the full vital capacity or anything near it and died a cardiac death.

DR. J. A. MYERS, Minneapolis: It is evident that this splendid contribution by Drs. Ulrich and Nathanson has been carried out in a very thorough-going and scientific manner. Their data, therefore, being reliable, will be found of great value to others who desire to use them in a practical way or in further investigative procedures.

It is very gratifying that these investigators have found this test so valuable in diagnosis and prognosis and in studying clinical progress in cardiac disease, as has also been found by others in pulmonary disease.

DR. MOSES BARRON, Minneapolis: I think that the relation of the condition of the capillaries in the alveolar walls to the functional capacity of the lung as brought out in this paper, is very interesting. When the alveolar wall is thickened by the distended capillaries, as is the case in cardiac decompensation with passive congestion of the lungs, the elasticity of the lung parenchyma is reduced, and the process of respiration is altered. Those who remember the microscopic appearance of the lungs in chronic passive congestion, presenting the greatly engorged and tortuous capillaries, which distend the alveolar walls, can appreciate the embarrassment to respiration from the relative inelastic walls. It is obvious that with the more rigid alveolar walls, greater inspiratory effort is necessary to expand the lungs, and this results in dyspnea. Such a concept helps us to visualize the physical basis of dyspnea. It also helps us to explain the relation of vital capacity to dyspnea in heart disease; the diminution in the vital capacity being almost directly proportional to the intensity of the dyspnea.



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No. 12

## EDITORIAL

### BASIS FOR THE TUBERCULOSIS CAMPAIGN\*

Speaking broadly the present campaign against tuberculosis starts out with the fundamental premises that infection against tuberculosis is practically universal; that this infection occurs for the most part in early childhood; that breakdown with tuberculosis in later life is due to the giving way of what we are wont to call "normal resistance," a term of very indefinite meaning. Building upon these premises, there are at the present time three fairly well defined schools of thought more or less opposed to each other as to the need for and the basis of a campaign against tuberculosis.

There is first of all the group of tuberculosis workers, comprising most of those who are at present affiliated with the campaign, who believe that breakdown with tuberculosis is caused by factors that may be found in the environment, personal hygiene and habits of

the individual. Such factors as bad housing, bad living, bad working conditions, faulty personal habits of eating, sleeping, working, exercising, etc., are in a measure the ones that cause tuberculosis as distinguished from infection or tubercle.

There is a second group of thinkers of a much smaller proportion, most of whom are found in the eugenics school, who say that environmental causes and factors dealing with personal hygiene have relatively little to do with tuberculosis. The big fundamental cause is the racial factor. It does not matter what a man does, or how he works, or where he works. If he inherits the right kind of race stock, he will survive; if he does not, he will succumb to tuberculosis. Such men as Karl Pearson, Raymond Pearl and Charles Davenport would strongly defend this point of view.

A third group of thinkers headed by such men as Professor McCollum of Johns Hopkins University would minimize any apparent factors dealing with the infection and race factors and would lay the emphasis rather upon the nutrition factors. They would say that it is not so much a matter of environment nor is it a matter of race; it is what a man eats that determines his normal resistance and prevents his breakdown with diseases such as tuberculosis. This group would probably not be so extreme in their exclusion of other factors as the eugenics group, but they would lay the predominating emphasis upon nutrition.

The average worker in the campaign against tuberculosis, whether physician or layman, will use as a basis for his campaign, if he is wise, the distinctive ideas of these three schools. There is nothing conflicting between the three positions and a broad, comprehensive tuberculosis movement must recognize that breakdown with tuberculosis may well be a combination of environmental, racial and nutritional factors.

The campaign against tuberculosis in the United States is financed from the sale of Tuberculosis Christmas Seals. Sale of these Seals will be held in December this year. The earnest support of physicians in developing a broad program for the control of tuberculosis is desired.

\*Prepared by the National Tuberculosis Committee.

### A. M. A. OF VIENNA

The personnel of the teaching staff and the wealth of clinical material in Vienna has already begun to again attract the medical profession of America. Recently there were some twenty American physicians studying in Vienna, for the most part eye, ear, nose and throat specialists. The Viennese, strange to say, have not lost their cordiality although they have lost almost everything else as a result of the war, and returning physicians report a very kindly reception. So numerous are the visitors that there is considerable agitation towards the reestablishment of the American Medical Association of Vienna and resuscitating the Association property which was assigned to Dr. Lange who has returned to Chicago.

Professor Hayek now is in charge of the old Chiari Nose and Throat Clinic. Professor Neumann is assisted by Drs. Ruttin and Beck in the old Politzer Ear Clinic. English courses are given by these two assistants. Professor Dunnier has the old Fuchs Clinic and Professor Meller the former Dunnier Clinic, the latter being assisted by Dr. Boehstedt as first assistant and Dr. Fuchs as second assistant. Professor Alexander is at the Polyclinic and also is teaching Americans.

The foreign exchange is so ridiculously in favor of the American dollar that there is no doubt but that an American can live at a very fair Vienna pension on a dollar a day. In August a dollar bought 1150 kronen and at present about 1800. A street car ride is seven kronen or less than half a cent. The medical courses arranged as a rule by the department heads cost between 2000 and 3000 kronen an hour.

It is reported by a recent visitor that the first six months of 1919 were the very worst for Vienna since the war began. There was no food and no fuel. It was stated authentically that Hoover actually saved thirty per cent of the population of Vienna from starvation. Whereas, before the war, Austria had a population of thirty million, exclusive of Hungary, it now is reduced to six million, two million of whom reside in Vienna. There has been a rather general feeling in favor of the reinstatement

of the former Emperor Carl, the deplorable condition of Austria today being the main reason given. Many believe the only salvation of Austria lies in a union with Germany.

A period of study in Vienna would surely be quite worth while, but the steamship rates should be thoroughly investigated beforehand.

### TUBERCULOSIS IN MINNESOTA

Recently, at a conference of tuberculosis and other public health workers, the writer was requested to account for the reduction in the death rate from tuberculosis in Minnesota.

Along with other states, similarly active against the white plague, Minnesota has already reaped some of the benefits from its labors and now enjoys one of the lowest death rates from tuberculosis of any state in the registration area. A reduction of 17 per cent has been made since 1914. This reduction is for the state at large and includes areas not at all active in anti-tuberculosis work. Recently figures were compiled which showed a fall of 25 per cent in a district maintaining a sanatorium. In 1920 alone 426 deaths were prevented by reason of this reduced rate and had the 1914 death rate been experienced each year since that date 929 more deaths would have occurred than have been reported.

Von Behring contended that childhood infection confers immunity against subsequent contact with tuberculosis bacilli from outside sources, with lesions established in childhood remaining latent ever years, finally to reactivate upon the reduction of this acquired immunity with active disease developing in these lesions. The more recent views of Opie maintain that childhood infection, while conferring a protective immunity more or less relative, does not prevent fresh lesions from forming as a result of infections from outside sources during adult life, but does alter the type of resultant disease, producing the chronic pulmonary tuberculosis with fibrous tissue formation and tendency to healing which is distinct from the fulminating rapidly advancing type of the disease which develops among unprotected or non-vaccinated peoples coming in contact with the bacillus for the first time. We should in either case be inspired by the fact that because of an ever increasing edu-



educational campaign, a comprehensive, and, we anticipate, a growing institutional system, our people in increasing numbers, are being protected from the dangers of massive and repeated infections.

It is being demonstrated that the degree in which we care for our open cases of tuberculosis in quarters outside of the home reduces the supply of future consumptives.

Newsholme, in 1908, was able to show that should one-fifth of the total deaths from tuberculosis in a community occur in institutions, (in other words, outside of the home) following an average residence of one-third of a year, which is about one-ninth of the duration of the average fatal case, that the annual reduction of the death rate in that community should be about 2 per cent. Minnesota's experience would tend to prove this contention. With fourteen county sanatoria and one state sanatorium thousands of tuberculous individuals have been given opportunity for regaining lost health, a large majority of these being open cases whose residence in institutions has removed the source of tuberculous infection from numerous homes. Over 5,500 cases of tuberculosis had passed through our county sanatoria alone on January 1, 1921. Of these, 2,087 cases had tubercle bacilli at some time.

The knowledge that the fight against the white plague is being won here in Minnesota should greatly encourage all of us to renewed and still greater efforts. The activities of the many public health organizations, county and municipal, as well as state, have through their various projects stimulated wide spread interest in health matters and have placed in the hands of a great majority knowledge of health conditions, disease prevention and remedial measures required.

R. B.

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## OBITUARY

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### GEORGE F. MERRITT

The long medical career of Dr. George F. Merritt, of St. Peter, was brought to its close on October 26, 1921. Born December 21, 1846, in Danville, N. Y., the son of George and Harriet (Hicks Wright) Merritt, in 1856 he moved with his parents to Burlington, Iowa. Here he attended the public schools and graduated from Burlington College. He received his medical degree from Rush Medical College, Chicago, in 1872, and immediately began practice in St. Peter, where he practiced until his death. In 1876 Dr. Merritt married Miss Jenny Lambie, of Plainview. He served as city public health officer for many years and at one time was coroner of Nicollet County. Besides being a member of County and State Societies and the American Medical Association, he served as treasurer of the Minnesota Valley (now Southern Minnesota) Medical Association, and one year was its president.

Dr. Merritt is survived by Mrs. Merritt and four children, Mrs. Philip Dick, Louise, Laura and Robert Merritt.

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Frank L. Bradley, M. D., St. Louis Park, Minn. Seventy-seven years of age; graduate of Rush Medical College 1868; died Oct. 12, 1921.

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John Rundstrom, M. D., St. Peter, Minn., eighty-six years of age; died during October, 1921.

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John Henry Stewart, M. D., St. Paul; born 1861; graduate of Cornell University and College of Physicians and Surgeons of New York City; died during October, 1921.

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## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

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### SOUTHERN MINNESOTA MEDICAL ASSOCIATION

#### ANNUAL MEETING

Mankato, December 5th and 6th, 1921

#### OFFICERS

Dr. W. J. McCarthy, Madelia, President.

Dr. E. D. Keyes, Winona, 1st Vice President.

Dr. W. R. Ramsey, St. Paul, 2nd Vice President.

Dr. H. T. McGuigan, Red Wing, Secretary.

Dr. G. F. Merritt, St. Peter, Treasurer.

Dr. Aaron F. Schmitt, Minneapolis, Secretary-General.

Monday, 2 p. m., December 5th

*Symposium:* "Campaign in Southern Minnesota for the Prevention of Cancer"—Dr. H. W. Cook, Minneapolis; Dr. H. B. Zimmerman, St. Paul; Dr. C. H. Mayo, Rochester.

"Primary Carcinoma of the Lung"—Dr. R. I. Rizer, Minneapolis.

"A Discussion of the Changes Produced in the Blood Stream by the Rational Treatment of Infected Teeth and Their Investing Tissues"—Dr. T. B. Hartzell, Minneapolis.

"Factors in the Health of Older Children"—Dr. E. J. Huenekens, Minneapolis.

#### Monday, December 5th

ANNUAL BANQUET, MASONIC HALL, 6:30 P. M

#### Monday, 8 p. m.

Address of Welcome—Mayor W. A. Beach.

President's Address—Dr. W. J. McCarthy, Madelia.

"Industrial Medicine and Surgery" (L)—Dr. W. O. Sherman, Pittsburgh.

"Causes of Failure of Operation for Chronic Appendicitis"—Dr. C. J. Rowan, Iowa City.

"Treatment of Duodenal and Gastric Ulcer"—Dr. A. C. Strachauer, Minneapolis.

"Surgical Aspects of Neurological Surgery" (L)—Dr. A. W. Adson, Rochester.

#### Tuesday, 8 a. m., December 6th

"Chronic Non-Tuberculous Lung Infection"—Dr. H. M. Conner, Rochester.

"Resume of Recent Progress in Urology"—Dr. W. F. Braasch, Rochester.

"Premenopausal Uterine Prolapse"—Dr. E. Z. Wanous, Minneapolis.

"Diagnosis and Treatment of Osteomyelitis"—Dr. C. C. Allen, Austin.

"The Dental Examination" (L)—Dr. B. S. Gardner, Rochester.

"Chloroform Anesthesia"—Dr. P. F. Holm, Wells.

"Pyelitis"—Dr. A. E. Sohmer, Mankato.

#### Luncheon—12:00 to 1:00 p. m., Tuesday

This luncheon is tendered by the Physicians and their Ladies of Mankato.

#### Tuesday, 2 p. m., December 6th

"Psycho-Analysis"—Dr. C. R. Ball, St. Paul.

*Symposium:* a. "A Resume of Partial Rectal Prolapse with a Suggestion as to Treatment" (L) D. W. A. Fansler, Minneapolis.

b. "The Technique of Removal of High Rectal and Sigmoid Polyps" (L)—Dr. L. A. Buie, Rochester.

"Surgery in Perforated Typhoid Ulcer" (L)—Dr. F. C. Schuldt, St. Paul.

"Recognition of the Sphenopalatine Ganglion"—Dr. R. A. Barlow, Rochester.

"The Treatment of Empyema"—Dr. A. C. Baker, Fergus Falls.

"Thyroid Therapy"—Dr. R. G. Allison, Minneapolis.

"Complications following Surgery of the Gall Bladder and Bile Ducts"—Dr. W. C. Carroll, St. Paul.

"Retroperitoneal Lipomata" (L)—Dr. J. C. Masson, Rochester.

A Minnesota branch of the Society for Experimental Biology and Medicine (New York) has been organized and held its first meeting at the Men's Union, University of Minnesota, on October 12, 1921.

The meeting was preceded by an informal supper. Dr. Arthur D. Hirschfelder was elected Executive Secretary, and Doctors F. H. Scott, E. C. Kendall, E. J. Lund and L. S. Palmer were elected members of the Advisory Committee.

Dr. E. B. Meigs of the United States Department of Agriculture gave a brief address on "Amino Nitrogen of the Blood in its Relation to Diet and Milk Secretion." The following papers were then presented:

E. J. Lund—A Micro-Winkler Method for the Determination of Dissolved Oxygen.

R. Green (by invitation)—An Apparatus for the Direct Determination of Surface Tension.

W. P. Larson—Effect of the Surface Tension of the Culture Medium upon the Growth of Bacteria.

J. F. McClendon and H. Bauguess (by invitation)—Experimental Rickets.

A. D. Hirschfelder and L. J. Pankow (by invitation)—Does the Introduction of an Ethoxy Group into Aromatic Compounds Increase their Bactericidal Action upon the Pneumococcus and the Gonococcus?

There is only one other branch of the Society for Experimental Biology and Medicine besides this branch at Minnesota.

The twentieth semi-annual meeting of the Blue Earth Valley Medical Society was held at Blue Earth, Minnesota, Thursday, October 27th. Papers were presented by the following physicians: Drs. S. Erickson, H. B. Bailey, A. F. Hunt, F. W. Logan, S. Hermann, W. J. Richardson and G. H. Luedtke.

At the recent annual meeting of the St. Louis County Medical Society the following officers were elected: Dr. C. L. Haney, president; Dr. O. W. Parker, vice president; Dr. L. A. Barney, second vice president; Dr. F. H. Magney, secretary and treasurer; Dr. W. A. Coventry, delegate; Dr. A. H. Collins, alternate delegate; Drs. S. H. Boyer, J. J. Eklund and E. L. Creney, board of censors. All elected members, with the exception of Dr. Barney, who is from Ely, are residents of Duluth.

At the annual meeting of the Lyon-Lincoln Medical Society, held at Tracy October 11th, the following officers were elected: Dr. W. G. Workman, Tracy; president; Dr. G. L. Jacquocat, Tyler, vice president; Dr. H. M. Workman, Tracy, secretary-treasurer; Dr. L. Vadheim, Tyler, delegate; Dr. O. L. Bossingham, Lake Benton, censor for three years.



## OF GENERAL INTEREST

Dr. R. Gilmore, of Bemidji, has returned from a trip to Chicago.

Dr. E. P. Hawkins and family, of Montrose, have gone to Florida for the winter.

Dr. Mary McCoy, of Duluth, announces the opening of offices at 404-406 New Jersey Building.

Dr. E. L. Kannary, of St. Paul, has returned from a hunting trip spent in the northern part of the state.

Dr. C. R. Sanborn, of Bemidji, has been in Chicago where he attended the Soo Surgical Association convention.

Dr. C. V. Lynde, who has been practising medicine at Waubun, Minnesota, has recently located in New London.

Dr. Harry T. Frost, of Crookston, has located in Hallock, where he will engage in the practice of medicine and surgery.

Dr. Wm. Meierding, of Springfield, has received his reappointment as Examiner for the U. S. Public Health Service for that district.

Dr. George A. Geist, of St. Paul, attended the Clinical Congress of the American College of Surgeons held in Philadelphia during October.

Dr. Howard Weirick, of Hibbing, has been appointed a member of the State Board of Health. Dr. Weirick will succeed the late F. W. Cappelen.

Dr. Arthur T. Caine, for many years a practicing physician at Anoka, has been appointed superintendent of the Anoka State Hospital for the Insane.

Dr. W. T. Anderson has recently moved to St. Paul and is associated with Dr. Lerche. He is a Johns Hopkins graduate and served in the medical service during the war.

Dr. Waltman Walters, of Rochester, recently delivered an address before the American Association of Physicians and Surgeons at their annual meeting held in Chicago.

Dr. F. C. Mann, of the Mayo Clinic, Rochester, gave a very interesting lecture in the Clinic Lobby on the evening of October 21st on the subject of Experimental Research.

Dr. Cyrus Northrop, ex-president of the University of Minnesota, delivered a Mayo Foundation lecture on general education, Tuesday, October 11, in the lobby of the Mayo Clinic.

Dr. S. B. Haessley, of Faribault, left the last week in October for Great Falls, Montana, where he joined a hunting party which started for the Rocky Mountains in search of big game.

Dr. P. C. Davison and Dr. B. J. Branton, of Willmar, were given fellowships in the American College of Surgeons. They received these honors publicly at Philadelphia, October 28th.

Dr. A. W. Adson, of the Mayo Clinic, Rochester, recently read a paper before a medical meeting at Lewiston, Idaho, following which he presented a paper before another medical gathering in Philadelphia.

Dr. A. F. Schmitt, of Mankato, has moved to Minneapolis and has opened offices at 705-707 Physicians and Surgeons Building. Dr. Schmitt will still retain the office of secretary general of the Southern Minnesota Medical Association.

Dr. E. W. Benham, of the Mankato Clinic, Mankato, accompanied by his family, left on an extended automobile trip which will include many of the large eastern cities. They will then motor to Florida where they will spend the winter.

The Board of Regents of the University of Minnesota has granted a three months leave of absence to Dr. J. P. Sedgwick, head of the department of pediatrics. The Board has also granted a year's leave of absence to Miss Louise M. Powell, superintendent of the school of nursing.

Dr. Lillian L. Nye formerly instructor in the Chemistry department of the University of Minnesota, has taken her M. D. degree from Johns Hopkins and has later completed a year in Pediatrics. She has come to St. Paul and will be associated with Dr. Katherine Nye and Dr. Jennette McLaren at 803 Lowry Bldg.

Sir Harold Stiles, of Edinburgh, Scotland, presented a paper, "Brachial plexus neuritis caused by pressure of the first rib," before the meeting of the general staff of the Mayo Clinic, Wednesday, October 12. He also delivered a Mayo Foundation lecture, "The history of medicine in Edinburgh," Friday, October 14.

Dr. C. Eugene Riggs, President of the Minnesota State Medical Association, gave a Mayo Foundation lecture Tuesday, October 4 in the Assembly Room. Dr. Riggs repeated his presidential address, "Minnesota Medicine in the making; personal reminiscences," which he gave at the meeting of the Minnesota State Medical Association in Duluth, August 24.

The Wright County Medical Society recently held its annual meeting at Buffalo, Minn., at which the following officers were elected for the ensuing year: Dr. E. E. Shrader, Watertown president; Dr. A. G. Moffatt, Howard Lake, vice president; Dr. John J. Catlin, Buffalo, secretary; Dr. C. L. Roholt, Waverly, delegate, and Dr. E. E. Shrader, Watertown, alternate.

The Children's Club has recently been opened at 1633 Portland Avenue, St. Paul, under the supervision of Mrs. R. L. Barry. The Club is designed to meet the needs of busy mothers who, during social engagements, desire assistance with their children; and of parents who wish to be absent from home for the evening or longer, or who, through illness, find it convenient to have their children cared for temporarily. The Club is endorsed by several leading physicians and business men of prominence. A trained nurse experienced in the care of children will be in constant attendance.

The merger of the Schools of Nursing of the Minneapolis General Hospital, the Charles T. Miller Hospital of St. Paul, and probably the Northern Pacific

Hospital, with the School of Nursing of the University of Minnesota enables the University to offer a greatly increased registration with the greatly enlarged capacity for teaching, and also a more complete training of the nurse in public and private nursing and in all forms of disease, accident and emergency. Miss Louise M. Powell, Superintendent of the School of Nursing at the University, would be glad to receive the names of any prospective students of nursing. The students in nursing share the privileges and opportunities of all women matriculants in the University. The University offers the following courses: (a) A three years' Course in Nursing. (b) A five years' combined Course in the College of Science, Literature and the Arts and in the School of Nursing. (c) A Course in Public Health Nursing for Senior and Graduate Nurses.

Public Health Nursing—The second course in Public Health Nursing for 1921-22 will open on January 4, 1922. Lecture courses are given by University teachers in the Medical School and the Department of Sociology and by representatives of the State Board of Health. Practical work is conducted in co-operation with the Hennepin County model practice field, the Visiting Nurse Association, the Infant Welfare Society, the Public School Department of Hygiene, the industrial service of private corporations, the County Tuberculosis Sanatoria, and the Medical Social Service Department of the University Dispensary.

A tuition fee of \$25.00 and contingent fees amounting to \$7.00 cover the course in each four months' period. Applications should be made to Miss Louise M. Powell, Superintendent, School of Nursing, University of Minnesota.

## MISCELLANEOUS

Mankato, Minn.,  
Oct. 31, 1921.

The medical profession is confronted with a problem that must lead to honor or dishonor as a sequel to the recent ruling of A. W. Mellon, Secretary of the U. S. Treasury. By this ruling a physician may prescribe two and one-half gallons of beer or two quarts of wine as a medicine and there is no limit as to how frequently he may give this prescription to the same patient. The ruling further provides that these beverages shall be sold by the druggist, delegating to him the right to determine whether or not the patient who holds a prescription for either one or both of these beverages is in need of the same for medical purposes. This is a veritable paradox.

By this ruling the druggist is made the bar tender and the physician the servant of the inebriate, the wine bibber and the beer drinker;

Therefore, resolved first, by the Blue Earth County Medical Society in regular session assembled that the medical profession does not recognize wine

and beer as a medicine; but, if in particular cases it be so recognized by some physicians, the present power delegated to physicians to prescribe for medicinal purposes, not to exceed a pint of liquor in ten days to any one person, is surely sufficient in the interests of the sick.

Second: that we recognize in beer a certain amount of nutrition which exists in the malt and the sugar but not in the alcoholic content. That we regret and deprecate the late ruling of the U. S. Treasury department which will operate as a flagrant technical violation of a portion of the constitution of the U. S. and create a greater disrespect for law and order.

Third: Resolved that we express the hope that the medical profession in general and the members of Blue Earth County Medical Society in particular will ignore the ruling of the secretary of the treasury and refuse, to the everlasting honor and credit of the profession, to use the powers thus delegated to the members of our profession by the aforesaid ruling.

Fourth: Resolved that a copy of these resolutions be spread upon the minutes; that a copy be sent to each of our Minnesota State Medical Journals, and to each of the following: President of the U. S., Secretary of the Treasury, Senator Knute Nelson, Senator Frank Kellogg, and Representative Frank Clague; that a copy be given to the Mankato Free Press for publication.

These resolutions were unanimously adopted by the Blue Earth County Medical Society, Mankato, Minn., Oct. 31, 1921.

EDITORIAL NOTE: This ruling does not affect physicians in Minnesota as our state is one of several which has a special law prohibiting the prescribing of beer by physicians.

## PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

September 1921 Meeting

Dr. W. A. Dennis, presiding.

The Annual Meeting of the Academy was held at the Town and Country Club on Wednesday evening, Sept. 14th, 1921.

Reports for the year were read and the following officers were elected for the ensuing year:

President—Dr. H. L. Staples, Minneapolis.

Vice President—Dr. C. N. McCloud, Saint Paul.

Secretary-Treasurer—Dr. H. P. Ritchie, Saint Paul.

Dr. J. G. Cross retires from the Executive Committee, which is now composed of Dr. W. A. Dennis, Dr. H. B. Sweetser and Dr. J. T. Christison.

Dr. Oscar Owre showed 2 x-ray films of a case of kidney stone wherein the diagnosis was made positive by a pyelogram.

Dr. H. P. Richie gave the following case report:

Mr. Wm. W., age 50.

1. Complaint:—Painless hematuria.



2. History:—In 1917, while at a ball game had feeling of urgency but held off until compelled, when he passed many clots. This lasted for 48 hours. Was cystoscoped in Chicago, with negative findings. He passed blood for about three days afterward when it stopped. Up to August 1921, had had no trouble and so far as he knows passed no blood. In August noticed blood, not much in morning specimen but during the day this would increase until it seemed almost pure blood and he began to feel weak. Frequency and urgency since bleeding began.

3. Examination:—On August 24, 1921, was cystoscoped by Dr. Gilbert Thomas, to find gross blood in urine. Several small papillomatous growths in bladder. Hanging from left ureter was a small papilloma which receded from view at times. Right kidney o. k.

4. Pre-operative Diagnosis:—Papilloma of pelvis of left kidney with transplants along left ureter and in bladder.

5. Treatment:—Operation. Through 2 incisions removed kidney and ureter intact on August 29, 1921.

6. Specimen:—Shows massive papilloma of kidney pelvis and ureteral grafts.

7. Comments:—This tumor is named in the literature as papillary carcinoma, epithelioma and papilloma. Sixty-four cases have been recently reported from the literature by J. J. May. Diagnosis before operation is rarely made because there is no enlargement of the kidney sufficient to make it palpable and there are no signs usually present except the hematuria. In this case the demonstration of a papilloma peeking through the ureter made the pre-operative diagnosis exact.

The operation is somewhat difficult but without reaction as all work can be done extraperitoneally. Two incisions: first the usual one for nephrectomy, and second, the one for ureteral stone. This latter may be made through the rectus or McBurney incision; the latter one I distinctly favor.

8. Result: The patient made an uninterrupted recovery and is prepared for follow-up treatment of fulguration of the bladder grafts.

It is interesting to note the massive tumor and the history of 4 years of no complaint or disability in his active work as switchman.

The specimen of kidney and ureter was shown.

The address of the retiring president, Dr. Warren A. Dennis, was read, the subject being "Compulsory Health Insurance."

The meeting adjourned.

# PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of October 12, 1921, at the Town and Country Club.

Dr. H. L. Staples, presiding.

Dr. A. C. Strachauer, Minneapolis, reported two cases.

Case I. Carl L., age 50 years.

Complaint:—epigastric pain, nausea and vomiting.

History:—In 1916 patient began to have seasonal burning, epigastric pain occurring 1 to 2 hours after meals, and which also awakened him at night. Relief was obtained by food and soda and by vomiting. There were frequent remissions but symptoms gradually increased in severity, until last summer (1921) when pain became constant. Patient has recently restricted himself to liquids because of distress attending coarser foods. No history of blood in vomitus or stool. No history of jaundice.

Examination:—Physical examination is negative except for loss of subcutaneous fat and evidence of recent loss of weight.

Laboratory findings: Gastric analysis—amount recovered 700 c. c. total HCl 63 c. c., free HCl 43 c. c. Blood and urine normal. Wassermann negative.

X-ray:—Obstructing ulcer at pylorus with retention.

Clinical diagnosis:—Chronic ulcer of duodenum.

Treatment:—Upper paramedian incision, calloused ulcer at pylorus exposed. Excision of the ulcer and modified Finney pyloroplasty. Gall-bladder and appendix negative.

Pathologist's report:—Indurated, thickened ulcer 1.5 cm. in diameter. Section shows mucosa replaced by fibrous tissue with extensive inflammatory reaction.

Subsequent history:—seventh day postoperative, temperature 98, pulse 70; normal, uneventful convalescence

Comment:—Gastroenterostomy still continues to be the mainstay in the surgical treatment of gastric and duodenal ulcer. The operation is, however, un-anatomical and unphysiological. While the majority of cases treated by gastroenterostomy obtain symptomatic relief, most of the chronic calloused indurated ulcers do not heal. This is also true of the similar type of ulcer treated medically, as verified by operation. The eradication of the ulcer is always a great satisfaction and should always be performed whenever possible, either alone or in conjunction with gastroenterostomy or pyloroplasty. The definite percentage of malignant degeneration of gastric ulcers is an additional reason for the resection of the latter lesion. The pyloroplastics with excision of the ulcer which I have performed have been one hundred per cent satisfactory.

Case II, John F., age 66 years.

Complaint:—Pain in epigastrium.

History:—In 1913, after a short prodrome of "dyspepsia" the patient began having burning epigastric pain two hours after meals, which was relieved by the taking of food or soda or by vomiting. A few weeks after the onset the patient had a frank hematemesis, and for a following period vomited "coffee ground" material. From 1913 to September 1921, patient had continually epigastric pain following meals, with relief by the taking of food, or vomiting. In September 1921 patient had a second large emesis

of old blood and following this was placed under diadetic management with no improvement.

Examination:—Elderly, well-developed, poorly nourished man. Negative except for enlarged prostate.

Laboratory findings:—Gastric content 300 c.c., total HCl 27 c.c., free HCl 10 c.c. Stool positive guaiac. Blood and urine negative. Wassermann negative.

X-ray:—Annular constriction of pylorus and of stomach representing a large indurated ulcer or an early carcinoma.

Clinical diagnosis:—1, gastric ulcer; 2, gastric ulcer with carcinomatous degeneration.

Treatment:—Partial gastric resection, anterior Polya through right paramedian incision. Prepyloric mass adherent to pancreas was exposed. Moderate grade of gastric adenopathy present.

Pathologist's report:—Old chronic, indurated ulcer of stomach showing considerable connective tissue scar deposit and carcinomatous degeneration. Gastric lymph nodes show metastatic carcinoma.

Subsequent history—Seventh day postoperative, temperature 98.6, pulse 70; normal, uneventful convalescence.

Comment: The 8-year history of hematemesis, vomiting of "coffee-ground" material, epigastric pain two hours after meals relieved by the taking of food, alkalies, or by vomiting, is the history of a chronic ulcer. The microscopic examination definitely proved the lesion to be carcinomatous at the time of operation. This malignant lesion has surely not existed for eight years or more, and the conclusion that a simple, chronic gastric ulcer with malignant degeneration is well founded. The presence of free acid is to be noted in the gastric analysis. Of an hundred gastric and duodenal lesions at the University Hospital in the year 1920, twenty per cent of the carcinomas showed free acid to be present, some having actual hyperacidity; and twenty-eight per cent of the ulcers were attended by hypoacidity or anacidity. The Polya type of gastric resection is an eminently satisfactory surgical procedure. The functional results are much more satisfactory than after gastroenterostomy, and the operation should be more frequently performed for the eradication of pyloric ulcers as well as for the treatment of malignant lesions. My oldest living case was performed eight years ago last February.

Discussed by Dr. Head: The second case reported by Dr. Strachauer is one of extreme interest. In a number of hundred cases of gastric and duodenal ulcer which I have observed during the past 25 years this is the first case of carcinoma superimposed upon ulcer which has come under my notice in which a history of vomiting of blood preceded by more than two years the development of the carcinoma. It would seem that the evidence was clear in this case that the carcinoma developed on an ulcer base be-

cause the hemorrhage had preceded by so long a period the carcinoma.

There is, however, one possible explanation which ought to be considered and that is the possibility of the hematemesis having originated out of an ulcer which had later healed up and that the carcinoma had developed in some other part of the stomach. Of course the pathologist could not determine this point at such a late date unless the scar of a healed ulcer were found in the gastric wall.

I am greatly interested in this phase of the subject. It is clearly admitted by pathological studies, and has been for many years, that about 10 per cent of the cases of carcinoma are developed on an ulcer base. I do not think that the evidence is clear that 10 per cent are pathologically so implanted, but that is the general concensus of opinion. When we get beyond the 10 per cent figure, however, the burden of proof rests with those men, mainly, surgeons, who try to maintain that any larger percentage than that originate out of an ulcer base. With the accumulation of additional evidence we are slowly swinging back to the 10 per cent figure. I have never seen a case of cancer of the stomach in which the history of hematemesis preceded by more than from one to two years the fullblown evidence of cancer. This well-accepted fact and the short history of gastric complaint in patients with gastric cancer makes the cancer superimposed upon ulcer theory untenable in a large percentage of cases.

Dr. L. E. Daugherty, St. Paul, presented two cases for Dr. MacLaren.

Case I. Mrs. M. E. W., patient of Dr. Thos. Trutna of Silver Lake, first seen in 1913. Operated on for acute cystic gall bladder and made an uneventful recovery. Next seen in August 1921. Age 50. Mother of 6 children. Complaints of a sense of "falling of the womb", constant pressure on the bladder especially at night. Pelvic examination showed a retroverted, large nodular, hard, fixed uterine tumor adherent to the uterine wall.

Operation was performed August 30th, 1921. Suprapubic hysterectomy, removed a large uterus with hard, calcareous subperitoneal fibroid, size of a goose egg, attached to the posterior wall, fixed in the pelvis. Specimen sent to Dr. Warwick at the Miller Hospital who reported a calcified leiomyoma. The following report was submitted by Dr. Warwick:

"Uterus about normal in size but on the posterior surface is a tumor about the size of a small orange. This is very firm in consistency and upon gross section is found to consist of a calcareous mass covered by a thin layer of muscle tissue. It is very nodular in appearance and is obviously a uterine fibroid which has consisted of whorls or firm white tissue which has later become calcified. Microscopic section of the uterine wall of the mucosa shows nothing of interest."

Thos. S. Cullen in "Adenomyoma of the Uterus"



published by Sanders in 1908 makes no mention of calcareous degeneration with reference to uterine tumors. In Cullen's earlier book on carcinoma of the uterus he mentions one somewhat similar case: "Uterine Calculi Associated with Adeno-carcinoma of the Body of the Uterus." He said:

"Our attention was first directed to this subject by a study of Cyn.Path. No. 161. In this case, during removal of carcinomatous tissue from the uterine cavity a calculus was brought away. On referring to Fig. 217 (p. 412) this is seen in a form of a hollow hemisphere presenting externally a rough irregular surface. Chemically the calculus was composed of a calcium carbonate and calcium phosphate. I advised the hypothesis that there had existed a partially calcified myoma, which, during the breaking of the carcinoma had also shared in the degenerative process, so that merely the shell of the calcareous material had been left. A subsequent reference to the literature brought to light a similar case reported by Thorn who has made a statistical study of uterine calculi from the time of Hippocrates down. Thorn's patient was 55 years of age. Six years after the menopause she began to complain of uterine hemorrhages. Six months later she experienced labor-like pains which were soon followed by a profuse yellowish, bloody discharge. The uterus was the size of a three months' pregnancy. After dilatation of the cervix a calculus nearly the size of a man's fist was removed. It was characterized by a corallike formation, and contained in the clefts a network of fibres. The discharge ceased, but the hemorrhages returned in two months, and from the examination scrapings carcinoma was diagnosed. On histological examination the stone was found to resemble a calcified myoma; indeed, Thorn was of the opinion that it was nothing more than a myoma that had become calcified."

Case II. Mrs. C. E. H., Luverne, first seen Feb. 22nd, 1899. Patient 33 years old; married 7 years; one child 6 years old. When she was carrying this child she nearly miscarried twice; was put to bed and was quieted with opiates and was able to carry through. She gives a history of constant pelvic distress for the past two years; worse just before menstruation; better after the flow starts. Inter-course very painful of late. Examination showed uterus enlarged and tender, pushed to the left by tumor which was supposed to be a tube-ovarian cyst.

Operation at St. Luke's Hospital Oct. 14th, 1899. Two uterine fibroids, one the size of a small orange, and one slightly smaller, each with a thick calcareous shell like the shell of a goose egg, were removed by myomectomy and the wounds closed with continuous catgut sutures. One year later, Dec. 25, 1900, she reports that she was better than she had been for years.

November 29th, 1901, the old pelvic distress has returned; the uterus was enlarged to the third month of pregnancy; uterus very tender. June 8th, 1902,

laparotomy. Enlarged uterus covered by adherent omentum. Calcareous fibroids almost the same as the tumors removed at the previous operation. Supravaginal hysterectomy; recovered; phlebitis of the left leg. July 10th, 1904, first had severe pain in the right breast, with tumor, so she says, the size of hickory nut; pain has continued off and on ever since. Tumor now the size of a goose egg, not adherent to the skin; glands were infiltrated clear to the apex of the axilla. October 21st, 1904, Halstead's radical removal of the breast; both pectorals and axillary contents. Died of general carcinomatosis in July 1905.

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Discussion by Dr. Dunsmoor, Minneapolis. I recall a case which Dr. Abbott saw with me in the late 80s. Patient had a fibroid uterus. We put a large negative plate over the abdomen and inserted needles from positive electrode through Douglas cul de sac into fibroid. Ten years after that I operated on this patient and each place where the needle was inserted had calcareous degeneration, masses from the size of little finger to that of thumb.

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Dr. E. M. Hammes, St. Paul, presented the following case.

Patient, male, 23 years of age; was under our care three years ago suffering from a dementia precocx from which he made an apparent recovery. In February 1921 he was again admitted to Mounds Park Sanitarium, with a picture of confusion, acute excitement, restlessness and delusional ideas. His mental condition varied—better at times and at other times the same. About August 1st he had an attack of vomiting and abdominal distress lasting 24 hours, which he said was due to eating some cigar stubs, with which subsided after a course of calomel. On August 14th he had a similar attack accompanied with considerable pain lasting 24 hours, without any temperature. On August 19th at 8 a. m. he complained of considerable abdominal pain and general tenderness; no temperature, no vomiting, no diarrhea. By noon the tenderness had markedly increased; the abdomen was rigid. At 5 p. m. his symptoms had increased; he had a temperature of 101 and a leucocytosis of 16,000. I asked Dr. George Earl to see him and Dr. Earl operated on him and found the following condition:

A belt buckle in his stomach; a teaspoon, many hairpins, sticks of wood, pieces of metal and other paraphernalia in the upper portion of the duodenum; in the large bowel one could feel many small stones, one fairly large bolt and other foreign objects. Dr. Earl removed the belt buckle from the stomach by an incision in the stomach and the foreign bodies from the duodenum by an incision in the deodenum. The patient rallied from the operation and the next morning he told me he had swallowed the teaspoon prior to his entrance to the hospital in February 1921. He did not remember when he swallowed the

belt buckle, but he said he had been swallowing substances off and on since his stay at the hospital. Along with this condition the patient had an acute inflammatory appendix which Dr. Earl removed. The patient died 48 hours later. No post-mortem was permitted.

Articles taken from patient were shown.

Dr. George Earl, St. Paul. The leucocyte count for the two preceding days had been rapidly increasing so we decided to operate, after making a diagnosis of foreign bodies. Marked tenderness over region of appendix and other point of tenderness over duodenum. Made a generous incision, felt a mass in abdomen, also the buckle in the stomach. The spoon was projecting through the pyloric opening but was unable to move it. The mass was implanted in the duodenum and we did our best to force it back into the stomach. In the region of the duodenum there was quite an exudate and we hesitated whether to do a gastroenterostomy and remove the foreign substances. Mental patients are the poorest risks. Even boils and abscesses that other patients stand very well cause death in mental cases. They often die from the slightest infection. We reflected the duodenum back and removed the mass. The appendix was also acutely inflamed, large swollen and edematous. We hesitated to remove that but felt that we might be taking a chance and so removed it.

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Dr. Herbert Jones, Minneapolis, showed a specimen of carcinoma of esophagus. Patient operated on by Dr. Lerche.

This man came to me about three years ago. Had a history running back for at least one year before that of gradually increasing difficulty in swallowing. We soon found that he had a stricture of the esophagus and sent him to Dr. Lerche. He looked at the esophagus and the important thing was that he could not get the esophagoscope down far enough to get into the stricture. There was absolutely no raw surface. He tried several times to get a piece off the esophagus for diagnosis. Finally concluded that it was not carcinoma.

Specimen shown. The stricture is well above the ulceration. The tumor had evidently grown underneath the mucous membrane and caused the stricture. The fact that he had a history running along practically 4 years ruled out carcinoma for him. The man went along with that condition of gradual emaciation but working up to within a few months of death.

This goes very well with these other cases reported this evening. Apparently this carcinoma had a history of 4 years' duration, so that I think the time of a good many of these carcinoma cases will have to be lengthened out and not limited to one or two years.

Dr. A. E. Benjamin, Minneapolis, reported two cases of ectopic pregnancy.

Case I. Mrs. G. M., age 32, housewife, American. Anemic. Past History: Healthy as a rule. Influenza and pneumonia two years ago.

Constipation moderate. Occasionally nausea and pyrosis. Menses: began at 13 years, regular and normal. Marital: 11 years. 1 child 10 years—normal pregnancy, labor and puerperium.

H. H. July 5, 1921, began having bloody discharge and bearing down pains. More or less continuous ever since. Noticed lump in lower abdomen at same time. Pains have become more severe and tend to come in spells.

Has been able to make bowels move only with greatest effort for past month.

Examination: Semi-cystic mass reaching to umbilicus, not tender, smooth surface. Cervix pushed tight against symphysis by a large mass filling the pelvis and flattening the rectum to the point of entirely obliterating its cavity. Mass quite tender, fluctuation (?) yet firm; no distinct hard nodules except anteriorly above the cervix—uterus (?).

Hemorrhagic spot in naval.

Leucos: 16,000. Hb. 53 per cent. Clotting time 4 min. Bleeding time 6 min. R. B. C. 3,500,000. Blood pressure 124/86. Diagnosis: Cyst of ovary. Myoma of uterus and ectopic.

Operation: 9/22/21. Gas and ether. N. W. Hosp. Midline incision. Large fibroid uterus—pregnancy of left tube ruptured. Fetus 2½ months. Movements noticeable. Left ovary slightly cystic. Supravaginal hysterectomy and removal of left tube. Rubber tube drain into cul de sac.

Convalescence: So far uneventful. Has had some abdominal pain. Somewhat distended. Slight rise of temperature in p. m. but has made a very good recovery.

Case II. Mrs. C. 33 years, clerk, American. Anemic.

Past History: Negative. Constipation, moderate.

Menstrual: Began at 14, regular 28 day type, duration 5-6 days, normal flow, no pain. An abortion at 2 months 5 years ago. Last period June 28, 1921, normal. When flow did not appear in July took hot douche and hot bath with resulting serosanguinous discharge. Continued 6 weeks. Severe pain in abdomen with weakness, fainting feeling, Aug. 29.

Examination: Sept. 9, 1921. Dulness in lower abdomen and semi-fluctuating mass in pelvis.

Hgb. 35. Leucocytes 11,000.

Diagnosis: Ectopic pregnancy.

Operation: St. B. 9/12/21. Gas and ether. Low median incision. Left tube bulging at fimbriated end. Abdominal cavity filled with old blood. Left tube and blood removed. Rubber tube drain. Hypodermoclysis on table.

Convalescence: Slow but uneventful. Citrate of iron by hypodermic for anemia. Temperature ranging from 99-101 for first week and gradually declining to normal.



Dr. R. E. Farr, Minneapolis, reported following case:

Name: F. M., age 21, single, student.

Entered hospital September 25, 1921.

Present Complaint: Injury to left hip.

History: While playing football patient was tackled and thrown, striking on his left hip. Was unable to move the limb, and has had considerable pain since the injury which occurred Sept. 25th, 1921.

General Examination: Negative.

Examination of left lower limb: Left foot is rotated inward, lying across the instep of the right foot, with the left knee lying against the right knee. Limb partially flexed. Muscles extremely tense. Greater trochanter above Nelaton's line.

Diagnosis: Dislocation of femoral neck, post glenoid. Radiogram confirms diagnosis.

Operation: Reduction under local anesthesia. No preliminary hypodermics. Six ounce infiltration block following the direction of the femoral neck with a five-inch needle. Before three ounces were injected the large muscles were completely relaxed. Slight movement of the femur was painless, and the limb was perfectly comfortable, whereas he had been suffering considerable pain before the injection was made. Three ounces more were used with the result that the boy could be lifted from the stretcher and laid on the floor without producing pain. Five minutes after the injection was finished the dislocation was reduced by manipulation. Two assistants held the pelvis in contact with the floor while I made the manipulations, assistance being necessary in order to lift the head over the rim of the acetabulum. The fifth attempt was successful. The radiograms show the condition before and after, and the photographs were all taken at the time of the operation. We had as perfect anesthesia as though the patient had been asleep and the relaxation was equally as good.

Dr. Gilfillan: What anesthetic, and of what strength, do you use?

Dr. Farr: 0.7 of 1 per cent procain.

Dr. Harry B. Zimmerman of St. Paul, read a Thesis on "Acute Intestinal Ilous."

NOTE: Discussion of Dr. Zimmerman's paper will be published with the paper in a later issue of Minnesota Medicine.

## NEW AND NON-OFFICIAL REMEDIES

During October the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

**Davis and Geck:**

Kalmerid Germicidal Tablets,

Potassium-Mercuric-Iodide.

**Eastman Kodak Company:**

Eastman Barium Sulphate for Roentgenology.

**Powers-Weightman-Rosengarten Co.:**

Copper Citrate—P. W. R.

Mercury Benzoate—P. W. R.

Mercury Cyanide—P. W. R.

Mercury Succinimide—P. W. R.

Silver Citrate—P. W. R.

Silver Lactate—P. W. R.

**Solution Arsphenamine—Lowy:** This product has been acquired by E. R. Squibb and Sons, and is retained in New and Nonofficial Remedies as Solution Arsphenamine-Squibb.

### NEW AND NONOFFICIAL REMEDIES

**Acne Combined Vaccine—Lederle.**—A suspension of killed acne bacilli and killed *Staphylococcus albus* and *staphylococcus aureus*. For a discussion of Mixed Bacterial Vaccines, see New and Nonofficial Remedies 1921, p. 314. Acne Combined Vaccine—Lederle is marketed in various size packages containing graduated doses of the vaccine. Lederle Antitoxin Laboratories, New York (Jour. A. M. A., Oct. 1, 1921, p. 1103).

**Protolac.**—A brand of calcium caseinate—N. N. R. For a description of the composition, actions and uses, and dosage, see Jour. A. M. A., Sept. 24, 1921, p. 1023. Dry Milk Co., New York.

**Benzyl Succinate—Seydel.**—A brand of benzyl succinate—N. N. R. For a description of the properties, actions and uses, and dosage, see Jour. A. M. A., Sept. 24, 1921, p. 1023. Seydel Manufacturing Co., Jersey City, N. J. (Jour. A. M. A., Oct. 8, 1921, p. 1183).

**Copper Citrate—P. W. R.**—A brand of copper citrate—N. N. R. For a discussion of the actions, uses and dosage of copper citrate, see New and Nonofficial Remedies 1921, p. 88. Powers-Weightman-Rosengarten Co., Philadelphia.

**Mercury Benzoate—P. W. R.**—A brand of mercuric benzoate—N. N. R. For a discussion of the actions, uses and dosage of mercuric benzoate, see New and Nonofficial Remedies 1921, p. 192. Powers-Weightman-Rosengarten Co., Philadelphia.

**Mercury Cyanide—P. W. R.**—A brand of mercuric cyanide—N. N. R. For a discussion of the action, uses and dosage of mercuric cyanide, see New and Nonofficial Remedies 1921, p. 183. Powers-Weightman-Rosengarten Co., Philadelphia.

**Mercury Succinimide—P. W. R.**—A brand of mer-

curic succinimide—N. N. R. For a discussion of the actions, uses and dosage of mercuric succinimide see New and Nonofficial Remedies 1921, p. 196. Powers-Weightman-Rosengarten Co., Philadelphia.

**Silver Citrate**—P. W. R.—A brand of silver citrate—N. N. R. For a discussion of the actions, uses and dosage of silver citrate, see New and Nonofficial Remedies 1921, p. 333. Powers-Weightman-Rosengarten Co., Philadelphia.

**Silver Lactate**—P. W. R.—A brand of silver lactate—N. N. R. For a discussion of the actions, uses and dosage of silver lactate, see New and Nonofficial Remedies 1921, p. 334. Powers-Weightman-Rosengarten Co., Philadelphia.

**Procaine-Adrenalin Hypodermic Tablets No. 2**.—Each contains procaine-Abbott (see New and Nonofficial Remedies 1921, p. 34) 0.02 gm. (1/3 grain), adrenalin 0.00004 gm. (1/1500 grain) and sodium chloride, sufficient so that when the tablet is dissolved in 1 c.c. of water the resulting solution is isotonic. The Abbott Laboratories, Chicago (Jour. A. M. A., Oct. 29, 1921, p. 1423).

**Patent Medicines in England**.—Broadly speaking, the ethical standards of the "patent medicines" industry in Great Britain in 1921 is that which obtained in the American "patent medicine" industry prior to the passage of the Food and Drugs Act in 1907. As long ago as 1912 the British Parliament created a Select Committee on "Patent Medicines". The Committee Published a report in 1914. The coming of the World War favored the nostrum interests and no legislative action was taken until 1920, when a Proprietary Medicine Bill was introduced into the House of Lords. Now comes the Medical Press and Circular (London) complaining that the bill has been pigeonholed. This publication points out that in 1920 the British government received revenue from the sale of "patent medicines" totaling 1,332,661 pounds, and that the very fact that a government hard up for revenue should be able to obtain so vast a sum from a business so largely tinctured with fraud and such a menace to the public health may be "a sufficient reason" in explanation of the British government's attitude of "innocuous desuetude" toward this bill (Jour. A. M. A., Oct. 1, 1921, p. 1107).

**Tired Rabbits for Diabetes and Ring-Tailed Monkeys for Sex Stimulation**.—In March 1919, an article by T. Webster Edgar appeared in the New York Medical Journal in which Edgar stated that he had treated successfully twenty cases of definite diabetes with intramuscular injections of his diabetic serum. No information was given regarding the serum except that it was prepared from normal blood after the animal is exercised to the point of fatigue. Subsequently, newspaper articles appeared in which Edgar is quoted as using the blood of rabbits first placed on a treadmill to produce fatigue.

In November 1920, an article by Edgar appeared in the New York Medical Journal on "Sterility, Sex Stimulation and Endocrines" in which he stated that he was interested in sex stimulation and that he had a serum which he was using with success in this condition. During the last year newspapers have carried sporadic reports of alleged remarkable results produced by Dr. Thomas Webster Edgar of New York through the transplantation of "interstitial gland" taken from "a special species of orang-outang". In a letter to a layman Edgar stated that the treatment was successful and that he was now treating all cases by this method, and that the fee for the operation was five hundred dollars inclusive of the sanitarium. Commencing Sunday, Oct. 1st, 1921, a series of sensational articles appeared regarding one of Edgar's alleged monkey-gland implantations. The material is played up in the style typical of yellow journalism. The statement that appeared in these articles to the effect that Edgar "is a member of the County Medical Society of New York" is incorrect. Edgar is not a member. The newspaper claim that Edgar is "an authority on glandular transplantation" should be accepted with reservations (Jour. A. M. A., Oct. 15, 1921, p. 1272).

**Sal Hepatica**.—Little information is given, or apparently ever has been given, by the proprietors, (The Bristol-Myers Co.,) in regard to the composition of Sal Hepatica. Some years ago medical journal advertisements contained the statement that it contained all the "Tonic, Alterative and Laxative Salts of the celebrated 'Bitter Waters' of Europe \* \* \* fortified by the addition of Lithium and Sodium Phosphates". It has also been claimed that Sal Hepatica is "a saline combination with the addition of Sodium Phosphate and Lithia Citrate."

The label of a recently purchased specimen contained the declaration, "Sal Hepatica is an effervescent saline combination possessing medicinal properties similar to the natural 'Bitter Waters' of Europe, and fortified by the addition of Sodium Phosphate." In view of these indefinite statements the A. M. A. Chemical Laboratory made an analysis of the product. The analysis showed it to have the following composition: sodium phosphate anhydrous 4.4 per cent, sodium sulphate anhydrous 26.5 per cent, sodium bivarbonate 19.5 per cent, tartaric acid, free 20.8 per cent, sodium chlorid 8.9 per cent, lithium phosphate trace, water of hydration (by difference) 7.2 per cent, Sal Hepatica, therefore, is essentially an effervescing mixture of dried sodium sulphate and sodium tartrate with a little dried sodium phosphate and table salt added. Sal Hepatica, then, is a simple effervescent saline laxative. It is essentially secret in composition and is sold under claims that would be laughed at were the full formula of the product a matter of public knowledge (Jour. A. M. A., Oct. 29, 1921, p. 1438).



## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

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THOMAS A. PEPPARD  
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**ON THE MECHANISM OF ABSORPTION FROM THE INTESTINE:** Samuel Goldschmidt. (Phys. Rev., Vol. 1, No. 3.) The limits of this review do not permit of a detailed discussion of this article which is an excellent review of the literature on this subject from 1859 to the present time. Each explanation, founded on experimental work bearing upon the subject, is presented and the hypotheses arising therefrom are set down. The old theory of osmosis is referred to.

The work of Heidenhain, Cohnheim and Reed on the "vital" or physiological activity of the intestinal cells is taken up extensively. The purely mechanical explanation of the mechanism of intestinal absorption is fully discussed. Attention is called to the tendency of investigators to focus their attention on one factor only, which has failed to explain the phenomenon, instead of considering the intestine as a whole and each structure an integral part of the mechanism. Goldschmidt believes that the mechanism of intestinal absorption is qualitatively explained by the known laws of osmosis, but that the theory of osmotic pressure is inadequate to explain all the phenomena which may be attributed to osmosis. It is interesting to note that the controversy, from the start has centered around physical or physico-chemical theories and the ultimate analysis probably lies in the development of physical chemistry.

PAUL H. ROWE.

**OCCULTISM WITH PARTICULAR REFERENCE TO SOME PHASES OF SPIRITISM:** By Charles K. Mills. (Amer. Jour. of Med. Sc., July, 1921.) The Philadelphia Neurologist reviews in this article a subject which does not come entirely in the category of medically useless knowledge. He defines the term "mysticism" as commonly used, to be more or less synonymous with occultism.

The horrible sacrifice of lives during the world war acted as an exciting cause, but back of that there is a more profound reason—"a resurgence of that which is primitive." The terrible calamities of war aroused instincts and emotions and removed men, for a time, from the control of sound reason. Crimes, so prevalent today, he states are best explained psychologically as a turning, under peculiar stress, to instinctive tendencies.

The question naturally arises: What kind of men interest themselves in spiritualism? Some famous

scientists have become enthusiastic supporters of spiritualism. He characterizes these men as leading lives in which reason and investigation pursue their way side by side with mystic tendencies. These men, while performing valuable scientific investigations on the one hand, nevertheless give evidences of marked mystical, or more plainly, instinctive and emotional tendencies not subjected to the usual intellectual control.

Ghosts are intimately associated with spiritualism in the minds of the public. He calls attention to the fact that many ghost stories have clearly fraudulent features. These are explained on the theory of hallucination, leaving out consideration of the definitely insane. Apparitions, to his experience in the majority of cases, occur in the period preceding deep sleep or in the period immediately after. Visual and other sensory hallucinations, it should be remembered, are indications of disordered cerebral action.

The so-called psychics, with their well known temperaments or well known constitutional tendencies, are of course easily influenced by mystic impressions. Concentration or disturbance of attention of spiritualists about their table may, and sometimes does, bring about muscular action induced by hypnotic phenomena of the auto or hetero suggestive type, so commonly misinterpreted.

Dr. Spiller characterizes men whom he has seen acting the part of mediums as "fat or fragile, sleek or frowzy."

J. C. MICHAEL.

**BLOOD CHANGES IN A GASTRECTOMIZED PATIENT SIMULATING THOSE IN PERNICIOUS ANAEMIA:** H. R. Hartman. (Am. Jour. Med. Sc., August, 1921.) Gastrectomy is a comparatively infrequently done operation. Dr. Hartman reports two cases of complete gastrectomy performed at the Mayo Clinic, which were carefully followed in their postoperative course to note any influence which it might have on the human economy in general. Hartman was struck by the similarity of the blood findings and symptoms in these cases, as compared with those found in pernicious anaemia. He assumes that possibly the lack of gastric ferments in these gastrectomized patients might have something to do with food splitting processes, rendering it abnormal, and resulting in hemolysis of the blood, or serving as a detriment to the blood forming organs. Description of the blood findings and symptoms are closely paralleled by typical cases of pernicious anaemia.

F. J. HIRSCHBOECK

**THE TRANSFUSION OF BLOOD, WITH A REPORT OF 186 TRANSFUSIONS:** I. S. Rayden and Elizabeth Glenn. (Am. Jour. Med. Sc., May, 1921.) A rather exhaustive review of the history of transfusion is given. The indications given are:

(1) Those due to loss of blood, such as from acute

hemorrhage, or long continued blood losses, smaller in extent.

(2) Diseased blood conditions due to poor hematopoietic function, decreased coagulability, decreased oxygen capacity, poor bactericidal or anti-toxic properties of the blood, and diminished nutrition.

(3) Shock.

One hundred and eighty-six transfusions were done on eighty-seven patients, and their conclusions are based upon observations made therefrom.

They are particularly optimistic concerning its value in acute hemorrhage where the limit of bleeding has not been reached, as well as in melena and in the hemorrhage of hemophilia. It is of value in debilitated or anemic individuals, in whom operations are contemplated. Cases of shock associated with hemorrhage are more amenable to treatment than those in which hemorrhage has not occurred. Its value in hastening remissions in pernicious anemia is mentioned. Its negative value in acute infections, acute leukemia and a plastic anemia, is in accordance with that of other observers. They believe the direct and indirect methods of transfusion do not vary greatly as far as the reactions are concerned, and advise the use of the former on account of its simplicity.

The mortality due to transfusions was 1.09 per cent.

F. J. HIRSCHBOECK.

#### EVIDENCES OF THE FUNCTION FROM THE PATHOLOGY OF THE KIDNEY TUBULE: L. A.

Turley. (*Ann. of Med.*, Nov, 1921.) Turley believes that a good deal of inaccuracy has existed regarding the structure and function of the kidneys on account of scientific investigation in renal physiology and pathology being improperly done. He has a concept of renal function which seems to be entirely his own, and yet, on account of its novelty is worthy of consideration. He has noted the cytologic similarity between the proximal convolution and descending portion of Henley's loop. Similarly, he notes a resemblance between the histologic components of the ascending loop of Henley and the distal convolutions. He therefore divides the uriniferous tubule into four parts on a structural and functional basis: (1) The glomerulus and capsule of Bowman; (2) The proximal convoluted tubule and the descending portion of Henley's loop; (3) The thin portion of the loop, which in structure is not analogous to any of the other components; (4) The ascending part of Henley's loop and the distal convoluted tubule.

His observation concerning the course of the tubules through the various parts of the kidney, and their relation to each other, is interesting. He has accurately measured the diameters of the tubules,

the numbers of convolutions, etc., with painstaking detail.

Through studies carried on by the author in partially degenerated and atrophied kidneys, he noted the following in the remaining normal tubules: (1) The glomerulus had increased in size materially. (2) The epithelium of the first few turns of the proximal convoluted tubules had assumed the flat, squamous form covering the glomerular tuft and lining the capsule of Bowman. (3) The remainder of the proximal tubule had increased at least twofold in diameter and length. (4) the descending arm of Henley's loop had similarly increased in diameter, and had become more tortuous throughout. (5) The thin portion of the loop was only a trifle enlarged, and the distal convoluted tubules had undergone but very little increase.

He concludes from these facts: (1) That the hyperplasia of the proximal system and the comparatively slight change in the distal convolutions is an index that the proximal system plays a larger part in the formation of urine. (2) In the alteration of the epithelium in these hyperfunctioning proximal tubules, approaching the type found in the capsule of Bowman, he believes there is brought about an assumption of the function of urinary formation in the proximal tubules. (3) The descending arm of the loop of Henley belongs functionally to the proximal tubules, as proved by the histologic changes that take place in these tubules.

His explanation of urinary secretion, however, which is dismissed with a few hundred words, and without any experimental support, is in vast contrast to the careful work done by other investigators, such as Cushny. What reasons he has for making his dogmatic statements regarding renal function, are not given. To quote his words: "The water and probably the simpler inorganic constituents pass through the epithelium of the glomerulus and the capsules. The more complexed, inorganic and organic elements, with the exception of sugar, are added by the proximal system. In the thin portion of the loop some of the water is reabsorbed into the blood. The distal system adds the sugar." He endeavors to prove this latter statement by the fact that in glycosuria he has noticed the infiltration of glycogen in the epithelium of the distal system, but nowhere else, indicating that the sugar is passing through the epithelium. There is nothing to prove that the glycogen is not being absorbed from the tubules rather than from the blood. The finding of casts in the distal system has been sufficient proof to the author that the thin portion of the loop reabsorbs the watery portion of the urine, as the casts, in his opinion, are due to the higher concentration of the urine.

F. J. HIRSCHBOECK.



## SURGERY

### SUPERVISORS:

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**THE ANATOMY AND SURGERY OF THE TRIGON:** H. H. Young and M. D. Wesson. (Arch. of Surg., 1921, Vol. 3, p. 1.) The anatomy of the trigon, particularly the trigonal muscle, is described in detail. The view that the trigonal muscle pulls upon the "internal sphincter," has supplanted the belief that the opening of the "sphincter" is an inhibitory action. The present view is supported by endoscopic and cystoscopic studies and by the fact that obstruction to urination is generally followed by hypertrophy of the trigon with corresponding atrophy when the obstruction is removed.

Occasionally following marked obstruction there is an undermining of the trigon, the hypertrophied muscle being dissected away from the bladder wall. On contraction it stands up as a ledge, dividing the bladder into two parts and preventing complete emptying. After this ledge is split the trigon is able to resume its normal functions. If, however, the trigon has been completely removed, micturition is not normal in that the bladder is not completely emptied.

The trigonal muscle is composed of an extension of the longitudinal muscle layer of the ureters and their sheaths and is superimposed on the muscle of the bladder wall. The embryology and anatomy of the vesical orifice are described, showing that there is no true sphincter, but that the vesical orifice is closed by two loops or arcs of muscles, one arising from the internal circular layer and the other from the external longitudinal layer of the bladder wall. The trigonal muscle passes in the form of an arc through the weaker arcuate muscles at the vesical orifice, and on contraction mechanically pulls them open. When the trigon is removed, micturition is difficult and incomplete. On the removal of one-half of the trigon, the remaining half functions and the bladder can be emptied completely. This is also true when the trigon is split, but the functional result is not so perfect.

The study of the pharmacology of the trigon muscle shows that it is innervated by true sympathetic fibers, as it contracts on treatment with epinephrin and ergotoxin. No parasympathetic nerve endings were found to be present, as there was no response to pilocarpin or atropin. The tests with nicotine gave a response indicating the presence of ganglionic structures. The bladder muscle proper gave reactions to both sympathetic and parasympathetic nerves. From the evidence of pharmacologic and

embryologic studies, which show an origin and a nervous control different from the rest of the bladder, it is deduced that the trigonal muscle contracts independently of the rest of the bladder.

The mechanism of urination was studied on a large series of cases with the cystoscope, from the urethra side and from inside the bladder through suprapubic cystotomies. Endoscopic studies of the opening and closing of the vesical orifice were also made. The action of the trigonal muscle was confirmed in every instance. When viewed from the urethra the vesical orifices was found not to be circular, but pear-shaped, and showed the sluggish lateral movement of the sides of the orifice, with the quick downward pull of the base, or trigonal muscle. When viewed from within the bladder the trigonal muscle was observed to contract and the vesical orifice to open, followed by normal voiding.

The changes in the trigon secondary to renal tuberculosis are described and six cases are cited showing the various stages. It is found that tuberculosis may produce not only marked thickening, but also shortening of the ureter, and that this in turn may cause traction on the vesical end of the ureter and trigon, leading to invagination of the margin of the ureteral orifice. This elevates the trigon on that side, leaving the bladder depressed around it.

Tuberculosis bacilli from the ureter find easy lodgement in these vesical pouches, while the greatly elevated ureteral ridge and trigon remain uninvolved. Ulceration may lead to undermining of the trigon, and separation from the bladder, as occurred in one case where the trigon was found floating, being attached only at the corners. It was cut loose and later removed through a cystoscope, but the patient thereafter had a small amount of residual urine. Urination is apparently normal as long as the trigon is not detached, but when the trigon becomes dissected free from the bladder muscle, micturition is less free and residual urine is present. If adhesions are present between the diaphragm and the kidney, on respiration the shortened tuberculous ureter causes the trigonal ridge to play back and forth like a piston rod in the invaginated ureteral orifice.

Trigonal obstruction simulating hypertrophy of the prostate is discussed, and numerous cases are described in which an obstruction at the vesical orifice caused hypertrophy of the trigon, with consequent diagnosis of enlarged prostate. The trigon here acts as a great transverse dam on the floor of the bladder, behind the vesical orifice, preventing the passage of urine. A diverticulum, holding 250 to 300 c.c. of urine, may be formed in cases in which the obstruction has persisted sufficiently long to cause pouch formation back of the hypertrophied trigon, or an undermining of the trigon. In such a case, removal of the barrier is not sufficient to restore the normal function of the bladder, for the trigon acts as a septum shutting off the flow of urine through the prostatic urethra. The valve-like effect of the un-

dermined trigon must then be destroyed. The force of the contraction of the trigonal muscle dissected partly free from the bladder wall, irrespective of the amount of hypertrophy, is not properly applied to help in the opening of the vesical orifice.

The surgery of the hypertrophied trigon is discussed and eight detailed reports are given, illustrating the various conditions and methods of treatment. The obstruction can be attacked by the intra-urethral, perineal, and supra-pubic routes. In fairly small hypertrophies the trigon and median bar may be caught in a punch, devised by Young, and excised. For greater hypertrophies, Young has constructed a "cystoscopic trigonotome," which is used to divide the trigon either through the urethra or through a perineal incision. The operation of choice in large hypertrophies is a suprapubic cystotomy with splitting of the trigon with scalpel or scissors. Hemorrhage is controlled by sewing the cut edges with a continuous suture of chromic catgut.

There must be as little destruction of the muscle as possible, in order to preserve its function. The ideal in all cases is to restore as far as possible the base of the bladder to its original condition, removing the obstruction and its accompanying pouch, but leaving a maximum amount of uninjured trigonal muscle. The experience of the authors is that with the removal of all vesical obstructions and preservation of a maximum amount of trigon, the untoward symptoms disappear, and practically perfect function is restored.

O. S. PROCTOR.

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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**THE TWO FLAP LOW INCISION CAESAREAN SECTION:** Alfred G. Beck. (Surg. Gyn. & Ob., Vol. 31, No. 3.) In reviewing the experience at the Long Island College Hospital, Beck notes that peritonitis was the cause of death of over 10 per cent of the patients delivered by the usual supra-pubic caesarean section. He describes the technique of his operation clearly with good illustrations. He also presents detailed records of 29 patients.

The essential points in the operation are:

(1) A low suprapubic abdominal incision. (2) Transverse division of the peritoneum 2 cm. above the bladder and the formation of two flaps by; (a) stripping the bladder down from the anterior surface of the uterus, (b) lifting the upper layer by blunt dissection. (3) Midline incision in the lower uterine segment. (4) Extraction of the child by the hand or forceps. (5) Before separating the mem-

branes, traction sutures are placed in the angles of of the uterine wound to protect the abdominal cavity from the "spill" when the secundines are delivered, and to hold the incision in suturing. (6) The uterus is closed by two layers of catgut. The upper peritoneal flap is brought well down and fastened by interrupted catgut, and the lower flap is brought up and sutured at least 1 cm. over the upper sutures. This forms a double barrier to extension of infection to the peritoneum. Should infection occur, spontaneous drainage is obtained either in the lower end of the abdominal wound or through the cervix.

Of the 29 cases reported: 21 had been in labor at least 10 hours and 16 for more than 24 hours. The membranes had been ruptured in 19 and for more than 10 hours in 15 cases. Seventeen patients had been examined vaginally, and 5 had been examined repeatedly.

Convalescence was afebrile in 14. Seven ran a low grade fever for a few days, but with no elevation of the pulse or leucocytes; eight patients presented a more prolonged elevation of temperature with increase of pulse rate, but reached normal between the 7th and 10th days. This event was usually accompanied by the appearance of a purulent lochia, or breaking down of the abdominal incision.

The author concludes. (1) An efficient test of labor may be permitted in certain border-line cases of dystocia, since those who fail may be delivered by this technique, and with but little added risk. (2) The so-called, "potentially infected" woman may be delivered without sacrificing her uterus. Though the present series is too small to draw final conclusions, the mortality will certainly be less than that of craniotomy or hysterectomy following caesarean section in this class of cases.

ARCHIBALD L. McDONALD.

**EARLY SQUAMOUS CELL CARCINOMA OF THE CERVIX:** T. S. Cullen. (Surg. Gyn. & Ob., Vol. 32, No. 2.) Cullen reports an interesting case of early cancer of the uterus. The patient had undergone a diagnostic curettage for intermittent bleeding. The curettings showed an area of unmistakable squamous cancer. Accordingly radical panhysterectomy was done. The specimen showed a submucous myoma and a small area of squamous cancer at the level of the internal os. The article is accompanied by a number of excellent microscopic studies showing the cell changes and structure of early cancer.

ARCHIBALD L. McDONALD.

**THE INDUCTION OF LABOR COMPLICATED BY HEMORRHAGE:** E. P. Davis. (Amer. Jour. of Ob. and Gyn., Vol. 2, No. 1.) The author presents briefly his indications for the induction of labor as follows: 1. In primiparas, rarely for contracted pelvis. Most often to save the life or to conserve the health of a patient whose pregnancy is complicated by other conditions. 2. In multiparous patients: (a)



who give a history of previous difficult labors with disproportion between the fetal head and maternal pelvis, (b) a tendency to go overtime, (c) severe visceral disease, (d) in certain cases of marginal placenta previa by rupture of the membranes, (e) in fulminating toxemia, only when the patient is in or has completed the first stage of labor.

Davis prefers the use of bougies with vaginal packing. He objects to bags as less satisfactory, tend to displace the presenting part, and cause more pain and discomfort. The only objection to bougies is the possibility of separation of the placenta or injury of the placental site. He discusses three cases complicated by intrapartum hemorrhage. It was possible to demonstrate other causes for the bleeding and in none of them was there injury to the placenta. In a fourth case, one of the bougies had perforated the placenta, but there was no bleeding.

After careful consideration, the author accepts this method as the most uniformly satisfactory. The result most closely resembles normal labor, and he does not believe that bougies of themselves cause serious hemorrhage.

ARCHIBALD L. McDONALD.

#### RHYMICITY OF THE PYLORIC SPHYNCTER:

Homer Wheelon and J. Earl Thomas, (Amer. Jour. Phy. Vol. 54, No. 3, p. 460.) Because of the inability to explain, upon accepted theories, radiographic observations on the human stomach, the authors undertook a study on the physiology of the opening and closing of the pyloric sphincter of dogs. Special attention was paid to the motility of the sphincter. Forty-four experiments were performed under ether anaesthesia. They studied unanaesthetized dogs, radiographically. The experiments were carried out by means of pylorographs of balloons which were placed and maintained within the pyloric sphincter. Two types of motility of the pyloric sphincter were demonstrated; a. active rhythmic contractions, and b. tone waves. The rhythmic contractions occur at the rate of 3 to 5 per minute, and are contractions and relaxations of the sphincter, followed by quiescence, and then a phase of inhibition prior to the next contraction. The tone waves, normally, are only sufficient to close the sphincter, but changes in tonicity influence the degree of contractility. When the finger was introduced through the sphincter of a dog with a permanent gastric fistula, violent contractions were excited which later passed off, but rhythmic pressure could be distinctly felt by the finger, and the sphincter never completely relaxed. The authors believe that, aside from Cannon's theory of acid control of the pylorus, intragastric pressure and peristalsis bear some definite relation to the activities of the sphincter.

PAUL H. ROWE.

## PEDIATRICS

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#### SOME OBSERVATIONS ON THE SO-CALLED INANITION TEMPERATURE OF THE NEW-BORN:

C. G. Grulee, and B. E. Bonar, (Amer. Jour. Dis. of Child., July 1921.) The writer states that for years it has been recognized that in a certain percentage of infants there occurs in the first few days of life a rise in temperature. This fever has not been accounted for satisfactorily. It is practically always transient in character and is accompanied by almost no disturbance of the general clinical findings. Holt states that from observations from the new-born at the Sloane Maternity hospital it was not uncommon to find cases which in the first five days of life showed temperatures up to 102 or 104, accompanied by no evidence of local disease, and ceasing with the establishment of the free secretion of milk.

The renewal of the discussion of the subject came with Von Reuss in 1912. He states that the various factors which may be responsible for the condition are as follows: (1) Change from meconium to milk flora in the bowel; (2) the irritative action of bacterial decomposition products or toxins, as well as nourishment constituents and their catabolic products as such, on the intestinal cells not used to such irritation, or the resorption products on the whole organism; (3) the presence of products of tissue destruction such as one finds in the first days of life; (4) as a result of the slight fluid intake and the water impoverishment, and from this the resulting concentration of the tissue fluids and decrease of diuresis; (5) poor development of the heat regulatory apparatus.

Further observations of the writers of this paper failed to reveal any regular relationship between the inanition or transitory fever of the new-born and the quantity of fluid ingested, nor does it reveal any definite relationship between the percentage of weight loss and the temperature. They were therefore forced to the conclusion that the temperature rise in question was not regularly to be explained on the basis of dehydration. It was also demonstrated that the forcing of food after this temperature is accompanied by a fall so rapid that it seems more than likely that there is a definite causal relation between the taking of food and the fall of temperature. The increased permeability of the intestinal mucosa for egg albumin during this period of life, as shown in a previous communication, more recently the confirmation of the finding of indican in the new born by Von Reuss, and the fact that the intestinal canal within 24 hours after birth was invaded by bacteria as far as the pylorus,

suggested that the temperature elevation at this time might be due to the absorption of some protein products, bacterial or otherwise, from the intestine of the new-born. With the stimulation of digestion and the flow of gastric and intestinal juices produced by the taking of foods, the meconium, which before contained small quantities of fluid and therefore a humidity too low for the growth of bacteria, was invaded by bacteria. The meconium consisted almost entirely of protein material, the destruction of which would most readily account for the presence of indican in such a large proportion of urines. With the introduction of breast milk, the putrefactive processes in the intestines were reduced and there was a fall in temperature. That the condition did not give rise to more serious symptoms than were present might be explained by the rapid change of condition within the intestinal canal.

R. N. ANDREWS.

#### THE DEGREE OF IMMUNITY TO DIPHTHERIA INSURED BY A NEGATIVE SCHICK TEST: Wm.

H. Park, (Amer. Jour. Dis. of Child, July 1921.) There is good evidence supporting the view that sufficient antitoxin in the body to prevent the development of a positive Schick test under ordinary conditions will prevent the development of diphtheria. There can be no doubt that the injection of 500 units of anti-toxin gives an immunity for a period of from twelve to twenty days. A statement by Haven that 20 per cent of diphtheria bacilli are of a different type from the one used to produce toxin for the immunization of horses, and that the available monovalent anti-toxin will not completely neutralize the toxin made by this other type, and that, therefore, diphtheria may develop from infection with this other type in children showing a negative Schick test to the standard toxin, has not been confirmed. The evidence that anti-toxin is the only substance in the body that can prevent the toxin acting is also so conclusive that we can assume the negative Schick test means the presence of sufficient anti-toxin to neutralize it.

He recommends one-fortieth M. L. D. in 0.2 c.c. because he finds the large amount of fluid easier to give. Not only must the toxin be measured accurately, but it must be delivered wholly intracutaneously. If the small white area does not appear at the point of injection the test cannot be relied on. Too strong a toxin will give a larger percentage of positives than will the standard amount.

A negative Schick test in cases which give active immunity, either natural or acquired, when the toxin used and technic employed has been suitable, gives an almost complete security from diphtheric disease, not only for the immediate time but for the future.

Those that have natural anti-toxin and those who acquire it through toxin-antitoxin injections may harbor diphtheria bacilli, and if they later suffer

from tonsillitis, due to other microbes, throat cultures will contain diphtheria bacilli. The positive culture alone suggests but does not establish that the suspected case is one of diphtheria.

R. N. ANDREWS.

#### REPORT OF A CASE OF ANTENATAL INTESTINAL OBSTRUCTION, WITH SOME REMARKS ON OTHER FORMS OF INTESTINAL OBSTRUCTION IN INFANTS: Sidney A. Owen and Norman Lake

(Brit. Jour. of Child. Dis., Vol. 17, July-Sept., 1920, p. 115.) The child at birth was found to have marked abdominal distension, but otherwise appeared to be normal. Thirty-six hours later the child appeared to be in very good condition, pulse and temperature normal, but had vomited greenish fluid, probably meconium, twice. The bowels had expelled a plug of mucus. A diagnosis of intestinal obstruction was made and an operation was resorted to at once. The obstruction was found one foot above the ileocecal valve and due to a band arising from the mesentery and descending to the upper surface of the bladder, probably the remains of the vitelline artery of the embryonic circulation coming from the superior mesenteric. Death followed in a few hours. The authors point out that since the child was born with signs of intestinal obstruction, that it must have occurred in utero and that from the child's well being it would appear that even acute intestinal obstruction in the child's prenatal existence need not be accompanied by symptoms supporting the view that the vigorous peristalsis movements of the bowels commence only after birth.

E. F. ROBB.

#### ACUTE OTITIS MEDIA IN INFLUENZA FROM THE PEDIATRIC STANDPOINT: Peccival Nicholson,

(Arch. of Ped., Dec. 1920.) The subject of acute otitis media is an especially important one for the pediatricist. In young children it is probably more frequently overlooked by the practitioner than any other disease of childhood. Many cases are diagnosed central pneumonia when the otitis is the real source of trouble.

**SYMPTOMATOLOGY:** The infants and young children, who are most commonly affected have an entirely different symptomatology from the adults. It is varied and often very vague. The most constant symptom of acute otitis media is elevation of temperature ranging from 100 to 106, though the usual range is from 100 to 103. Dr. Holt says that of all inflammatory conditions which may be met in early life, otitis media perhaps most frequently gives rise to obscure febrile symptoms. Elevated temperatures in all cases of uncomplicated otitis media is not to be expected. Fevers in children and infants call for otoscopic examinations whenever the cause is not clear. The severity of the general condition occasionally overshadows all local symptoms of pain. Again in infants the first evidence of acute otitis



media is a purulent discharge without any previous evidence of pain. Older children experience more pain on account of the greater density of the drum membrane.

**PROGNOSIS:** Almost all cases with early diagnosis and proper treatment recover without any complication. The facility with which meningitis may be occasioned is explained by the close anatomical relation between the tympanic and cranial cavities through the medium of the petrosquamous suture.

**DIAGNOSIS:** The diagnosis is usually made by the otoscope unless the membrane has previously ruptured.

**TREATMENT:** The early and free incision of the membrana tympani, not even waiting until the drum head bulges. Dr. Holt says: "the advantages of early paracentesis in acute otitis media can hardly be overstated. I favor incision of the drum membrane in cases of doubt rather than waiting for more definite indications, with the attendant risks of delay."

Every infant and child then with a temperature, or any of the exanthemata, or influenza should have careful and repeated otoscopic examinations. Diagnose carefully, treat early and never await spontaneous rupture of the ear.

R. N. ANDREWS.

**VACCINATION OF PREGNANT MOTHERS AND NEW-BORNS WITH ESPECIAL REFERENCE TO THE DEVELOPMENT OF AN INTRAUTERINE IMMUNITY TO SMALL POX:** Hans Mensching. (Archiv. fur Kinder. kunde, Vol. 68, No. 1, p. 24.) The author reports the results of his investigations conducted during a small pox epidemic in Hamburg in the winter of 1916-17. He vaccinated 684 new-born infants within the first few days of life usually on the first day. Among this number, he obtained successful reactions in 71 per cent. Typical local reactions associated with enlargement of the axillary glands were obtained in practically all cases. There were however very few constitutional symptoms that could be ascribed to vaccination. In only a few cases was the febrile reaction commonly encountered in older children noted. The weight curve and the tolerance for food were apparently not affected. Prematures, weighing over 2300 grams, were also vaccinated with equally good results. That vaccination during infancy as successfully immunizes against small pox as when done later, he believes is shown by the report of Wolff. In order to determine whether vaccination produced immunity in the child during late pregnancy, he vaccinated 339 mothers and later vaccinated the infants. While in this series, the number of successful reactions was slightly less than in the unvaccinated mothers (14 per cent), yet he feels that the difference is so slight that the development for such immunity is rather the exception than the rule and should not be relied upon. He believes that new-borns with-

stand vaccination so well that one should not hesitate to employ it whenever there is an epidemic of small pox and danger of exposure.

M. D. OTT.

**THE USE OF CONVALESCENT SERUM AS A PROPHYLACTIC AGAINST MEASLES:** Franz V. Torday. (Zeit. fur Kinder., Vol. 29, No. 3, p. 148.) For those connected with institutions for the care of children, the problems of measles is a very serious one because of the almost universal susceptibility to this disease. It is also important in the case of young infants, in those in a weakened condition and in those who are already infected with tuberculosis. As a result of the investigations of Degkwitz who had employed convalescent serum with some success as a prophylactic against measles, the author injected the serum into 261 children of various ages ranging from infancy to 14 years who had never had measles and who had been exposed to the same. Of this number only 15 contracted the disease. The experiment was controlled by dividing the patients into two groups, to one group serum being given, members of the other group being treated in the usual way. The results obtained confirmed those of Degkwitz that convalescent serum given between the second and sixth day after exposure prevents the development of the disease with but few exceptions, though he can not agree that serum given in large doses as late as the 11th day is not efficacious as it did so in many cases. The dosage of the serum employed was in most instances 7.0-22.0 c. c. though in his later cases he used 3.5-4.0 c. c. with equally good results. The serum should be obtained from a donor between the 20th and 30th day of convalescence. The duration of the immunity could not be definitely determined, probably not in excess of 75 days in many cases, though he believes that, for obvious reasons, even a short period of immunity is of definite value in protecting those who need protection and in terminating epidemics in large institutions.

M. D. OTT.

**FOOD REQUIREMENTS OF THE NEW-BORN INFANT:** Harold K. Faber. (Arch. of Ped., Aug. 1921). The author contends that the colostrum intake of the infant during the first two or three days of life is wholly insufficient to supply the needs of the child. In a series of new-born children, complementary feeding was carried out usually with a suitable modification of cows' milk during the early days of life. The formula employed called for cows' milk, 100 c.c.; red label karo, 120 c.c. and 1 per cent barley water, 480 c.c. This gave percentage composition of 14 per cent sugar; 1.3 per cent protein and .3 to .6 per cent fat. Under this method of feeding the gain was 9 grams per kilo of body weight per day, and the infants ran a practically ideal weight curve. Additional food was administered so as to avoid any

danger of starving the infant, on the one hand, and of lowering the secretory activity of the mother's breast on the other hand.

Dr. Fritz B. Talbot, of Boston, in discussing the paper, emphasized the importance of fluid in the new-born infant. He stated that breast milk alone was not sufficient, and that the fluid intake of the infant should not be neglected. The loss of weight in the new-born was of two kinds: one was mechanical as the loss of meconium and urine, and the other was because the baby was burning up part of his body tissue to keep himself warm. He thought that the method used by Dr. Faber was good.

Dr. Harry Lowenburg, of Philadelphia, expressed the fear that the giving of extra milk in the early days of life might encourage the bottle habit. He stated that the fault lay in a lack of water and this could be made up in the form of water or glucose without presenting the bottle. Furthermore, he did not see just why we should try to prevent the initial loss of weight as in spite of that loss children thrived and developed normally.

Dr. Lewis Webb Hill, of Boston, did not agree with Dr. Faber's paper, but felt that the new-born baby should have enough food, in the breast milk for its needs. He did not believe the extra food was an advantage and that the reason little breast milk was furnished was because the intestine was becoming infected with the ordinary bacteria and if it was flooded with extra food and a great deal of harm might be done.

The author in closing the discussion states that in his experience he did not find that water was sufficient for these babies; that they required food in addition to the breast and did much better when they had the food than when they did not.

R. N. ANDREWS.

## BOOK REVIEWS

**BACTERIOLOGY FOR NURSES.** Harry W. Carey, M. D. Second Edition—1920 (F. A. Davis Company, London \$1.25).

This little book fills a long felt need for an accurate and comprehensive treatise of a scientific subject written in simple terms. The history of Bacteriology is treated in a most creditable manner and is followed by a discussion of classification, morphology, biology and general distribution of bacteria. Then comes most essential detailed directions and principles of sterilization and disinfection. Infection, immunity and immunity reactions are lightly touched-upon and then comes very good descriptions and discussions of the more common pathogenic bacteria and with each is given a most practical discussion of the mode of infection, necessary sterilization and immunity reactions, if present. From this the non-medical person may receive a fairly complete knowledge of the usual pathogenic bacteria and their relation to the human body.

Diseases caused by molds, yeast, higher bacteria and protozoa receive brief but adequate chapters. The bacteria usually found in milk and water, their significance and the various epidemics carried or started from such a source, is well treated. The diseases caused by unknown organisms are discussed briefly and the most modern theories given. Finally there is given a comprehensive glossary of all the medical terms used in the entire book.

In this age so many persons without complete medical educations, such as nurses, technicians, etc., are occupying important places in the various special branches of the science of medicine. To such persons this book will prove to be of great value by imparting knowledge by means of simple, understandable terms.

MARGARET WARWICK.

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